UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

MICHAEL BANERIAN, et al.,

Plaintiffs,

v.

JOCELYN BENSON, et al.,

Defendants,

and JOAN SWARTZ MCKAY, et al.,

Intervenor-Defendants.

Case No. 1:22-CV-00054-PLM-SJB

DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

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INTRODUCTION

Rarely is a court asked to inflict so much havoc for so little alleged benefit. Plaintiffs complain that Michigan's 2021 congressional plan (the Chestnut plan) has a total population deviation of 1,112 persons or 0.14%. This deviation is less than one fifth the size of the population deviation the Supreme Court approved in *Tennant v. Jefferson County Comm'n*, 567 U.S. 758 (2012). In that per curiam order, the Court promptly stayed and then vacated a three-judge panel's ruling that a congressional plan violated the equal-population rule. Plaintiffs, nonetheless, invite this Court to follow that same path—in a case where the equal-population claim is far weaker.

Meanwhile, Plaintiffs ask this Court to rewrite the Michigan Constitution by eliminating the "communities of interest" criterion and replacing it with another enumerated criterion of lower priority concerning political-subdivision lines. They build on this odd state-law theory—which they brought in the wrong court—both in Count I to attack the Commission's compelling justifications for the Chestnut plan's minor population variances and in Count II to mount a stand-alone traditional-districting-principles challenge. But they ignore, first, that the equal-population framework turns on the *State's* justifications, not a *plaintiff's* view about what the State's goals *should* have been and, second, that traditional districting principles are not mandated by the federal Constitution. That is the holding of *Rucho v. Common Cause*, 139 S. Ct. 2484 (2019), which could not have been clearer that "traditional criteria such as compactness and contiguity cannot" be "used as the basis for relief" in a redistricting case. *Id.* at 2500 (quotation marks omitted).

Undeterred, Plaintiffs ask this Court to adopt their remedial plan for the November 2022 elections as *provisional* relief. But that is not a means of preserving the status quo, and doing so would work a severe dignitary injury to Michigan's sovereignty. Plaintiffs' plan was

drawn in secret without public input, but the Michigan public recently rejected that approach, demanding that no redistricting plan govern the State unless drawn by the Michigan Independent Citizens Redistricting Commission (the Commission) in public and based on the public's extensive input. Besides, it is impossible for the State's election officials to implement a new redistricting plan at this stage. A plan imposed today could not be implemented without "heroic efforts," and "even heroic efforts likely would not be enough to avoid chaos and confusion." *Merrill v. Milligan*, --S. Ct.--, 2022 WL 354467, at *2 (Feb. 7, 2022) (Kavanaugh, J., concurring). Yet again, Plaintiffs ask this Court to follow a condemned path, this time of overhauling the State's congressional elections apparatus without even addressing equitable "considerations specific to election cases." *Purcell v. Gonzalez*, 549 U.S. 1, 4 (2006) (per curiam).

Nothing in Plaintiffs' motion commends itself to this Court's exceptional equitable powers, which should not be so recklessly exercised, as Plaintiffs demand. Every element of the preliminary-injunction test is unmet, and the motion should be denied.

BACKGROUND

1. For most of Michigan's history, redistricting was conducted by the State Legislature or, when that process failed, a court. Exhibit A, Ronald Liscombe & Sean Rucker, *Redistricting in Michigan Past, Present, and Future*, 99 Mich. Bar J. 18, 19–22 (Aug. 2020). This process enabled politicians and other partisan actors to draw redistricting plans in secret, without public input, and for narrow interests. *See League of Women Voters of Mich v. Benson*, 373 F. Supp. 3d 867, 882–93 (E.D. Mich. 2019), *vacated sub nom,* 140 S. Ct. 429 (2019).

In 2018, the nonpartisan advocacy organization Voters Not Politicians (VNP) successfully placed an initiative on the statewide ballot (Proposal 18-2) proposing that redistricting authority be transferred to an independent citizens commission. *Citizens Protecting Mich.'s*

Const. v Sec'y of State, 921 N.W.2d 247, 250–51 (Mich. 2018). VNP argued that redistricting plans should be oriented around communities of interest defined by residents of those communities, and it represented to the public that, under Proposal 18-2, members of the public would be able to "tell the Commission how they want their communities defined through a series of public hearings and online public comment opportunities before any maps are drawn." Exhibit B, VNP FAQ Website. ("What are communities of interest and how will the Commission incorporate them into the maps?"). Proposal 18-2 was "overwhelmingly" approved by Michigan voters and codified at Article IV, Section 6 of the State Constitution ("Section 6"). *In re Indep. Citizens Redistricting Comm'n for State Leg. & Cong. District's Duty to Redraw Districts by Nov. 1, 2021*, 961 N.W. 2d 211 (Mich. 2021) (Welch, J., concurring).

2. Section 6 mandates a balanced, bi-partisan body of Commissioners lacking prior political experience, Mich. Const. art. IV, § 6(1), and requires that all members of the public have the opportunity to provide input throughout the map-drawing process. First, before drafting even begins, the Commission must "hold at least ten public hearings throughout the state for the purpose of . . . soliciting information from the public about potential plans." *Id.* art. IV, § 6(8). Second, after drafting a set of plans, the Commission must again "hold at least five public hearings throughout the state for the purpose of soliciting comment from the public about the proposed plans." *Id.* art. IV, § 6(9). Third, before voting on a final plan the Commission must "provide public notice of each plan that will be voted on and provide at least 45 days for public comment on the proposed plan or plans." *Id.* art. IV, § 6(14)(b). The Michigan Constitution also requires that the Commission "conduct all of its business at open meetings," that it "conduct its hearings in a manner that invites wide public participation throughout the state," that it "use technology to provide contemporaneous public observation

and meaningful public participation in the redistricting process during all meetings and hearings," and that it "shall keep a record of all proceedings . . . ." *Id.* art. IV, § 6(10) and (17).

Subsection 13 of Article IV, Section 6 provides a list of criteria the Commission must utilize in descending "order of priority." *Id.* art. IV, § 6(13). Third on the list is the following criterion:

> Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates.

Id. art. IV, § 6(13)(c). That criterion is separate from, and ranked ahead of, another criterion providing that "[d]istricts shall reflect consideration of county, city, and township boundaries." *Id.* art. IV, § 6(13)(f).

The people of Michigan made clear that they want the above-described process—and *only* that process—to be the source of plans governing their elections. The Michigan Constitution provides that the Commission's "functions" are "exclusively reserved to the commission" and that "[i]n no event shall any body, except the independent citizens redistricting commission acting pursuant to this section, promulgate and adopt a redistricting plan or plans for this state." *Id.* art. IV, § 6(19). The Michigan Constitution also recognizes that the Commission's plans must be implemented in time for the State's even-year elections. It therefore requires that the Commission conclude its work and adopt final plans "[n]ot later than November 1 in the year immediately following the federal decennial census." *Id.* art. IV, § 6(7).

3. The Commission convened for its inaugural session in September 2020. But it could not begin redistricting until August 2021 because the census results were released "six months late" due to the global Covid-19 pandemic. *In re Indep. Citizens Redistricting Comm*, 961 N.W.2d at 212–13 (Welch, J., concurring). Nevertheless, the Commission "act[ed] diligently

pursuant to its constitutional mandate" and did not wait to begin its work. *Id.* But it was impossible for the Commission to meet the November 1 deadline. The Commission, instead, adopted a fallback deadline of December 30.

Prior to the data's release, the Commission began conducting hearings across the State to receive public input. All told, the Commission held at least 139 public hearings, including 16 hearings prior to drafting, and received nearly 25,000 comments through its online portal.

The Commission met its deadline by adopting a congressional plan, known as the Chestnut plan, in late December.[1] The plan was initially drafted in September 2021 by Commissioner Anthony Eid. The Chestnut plan was built on public comments. Commissioner Eid began by working with "heat maps" created by the Metric Geometry and Gerrymandering Group ("MGGG") Redistricting Lab, which collected the numerous public comments into a database and created visual representations of the thrust of public input. See MGGG Public Comment Portal Reports.[2] From that starting point, Commissioner Eid relied on the public input he personally heard and then worked with fellow commissioners to revise and refine the Chestnut plan in the manner that, in their judgment, best reflected the overarching public will. As the appended Declaration of Commissioner Eid shows, every district was informed by public comments, and every district was drawn to achieve unique and tailored communities-of-interest goals. Exhibit C, Eid Decl. ¶¶ 6–28.

The Chestnut plan was published alongside others at public hearings and published again for a 45-day notice-and-comment period. The Chestnut plan has a minor population deviation between the largest and smallest districts of 0.14%. This was apparent when the

[1] Commissioners named many proposed plans after tree species (e.g., the Hickory plan, the Palm plan, the Cherry plan, and the Birch plan).

[2] Available at https://www.michigan.gov/micrc/0,10083,7-418-106530---,00.html (last visited Feb. 18, 2022).

plan was published in October. On December 28, 2021, the Commission voted on and adopted the Chestnut plan by an 8–5 vote, with the five commissioners in the minority splitting their votes between two alternative plans.

4. Plaintiffs waited until January 20 to sue and January 27 to file the controlling amended pleading, ECF 7, (the Complaint). Plaintiffs also moved for a preliminary injunction on January 27. They present an alternative congressional plan, which was drawn in secret and incorporates no public input. Plaintiffs criticize the Commission's communities-of-interest choices; contend that, contrary to the Michigan Constitution, only "county, city, and township boundaries" qualify as communities of interest; and ask the Court to impose Plaintiffs' policy preferences on Michigan by "adopting Plaintiffs' proffered remedy map" as provisional relief for use in the November 2022 elections. Preliminary Injunction Brief (PI Br.), ECF 9, at PageID.118, 135.

THE LEGAL STANDARD

"A preliminary injunction is an extraordinary remedy never awarded as of right." *Winter v. Nat. Res. Def. Council, Inc.*, 555 U.S. 7, 24 (2008). The standard factors for deciding a preliminary-injunction motion are "(1) whether the party moving for the injunction is facing immediate, irreparable harm, (2) the likelihood that the movant will succeed on the merits, (3) the balance of the equities, and (4) the public interest." *D.T. v. Sumner Cnty. Sch.*, 942 F.3d 324, 326 (6th Cir. 2019). However, where a requested injunction implicates "the public interest in orderly elections," *Benisek v. Lamone*, 138 S. Ct. 1942, 1944 (2018), courts are "required to weigh . . . considerations specific to election cases and its own institutional procedures," *Purcell v. Gonzalez*, 549 U.S. 1, 4 (2006) (per curiam). Even if this principle does not (as it may) hold "that a district court may *never* enjoin a State's election laws in the period close to an election," it holds at the very least that a plaintiff must establish "(i) the underlying merits are

entirely clearcut in favor of the plaintiff; (ii) the plaintiff would suffer irreparable harm absent the injunction; (iii) the plaintiff has not unduly delayed bringing the complaint to court; and (iv) the changes in question are at least feasible before the election without significant cost, confusion, or hardship." *Merrill v. Milligan*, --S. Ct.--, 2022 WL 354467, at *2 (Feb. 7, 2022) (Kavanaugh, J., concurring).

ARGUMENT

I. Plaintiffs Are Unlikely To Succeed on the Merits

A. Count II

Plaintiffs have no serious prospect of success on Count II, which straddles the line between asserting state law against the State and asserting an equal-protection claim that is neither justiciable nor cognizable. Neither framing of this count affords it merit, and Plaintiffs' state-law arguments are, besides, legally incorrect.

1. The Eleventh Amendment Bars This State-Law Claim

This Court lacks jurisdiction to order the Commission to comply with "the Michigan constitutional criteria." Compl. ¶ 108. "Case law is legion that the Eleventh Amendment to the United States Constitution directly prohibits federal courts from ordering state officials to conform their conduct to state law." *Johns v. Supreme Ct. of Ohio*, 753 F.2d 524, 526 (6th Cir. 1985). Because the rationale of the *Ex Parte Young* sovereign-immunity exception is "wholly absent . . . when a plaintiff alleges that a state official has violated *state* law," the Supreme Court held in *Pennhurst State School & Hospital v. Halderman*, 465 U.S. 89 (1984), that such suits are jurisdictionally barred. *Id.* at 106. There is no election-lawsuit exception. *See, e.g.*, *Ohio ex rel. Skaggs v. Brunner*, 549 F.3d 468, 471 (6th Cir. 2008); *Ala. Legis. Black Caucus v. Alabama*, 988 F. Supp. 2d 1285, 1304 (M.D. Ala. 2013) (three-judge court) (per Pryor, J.).

Count II contravenes this doctrine. *See Pennhurst*, 465 U.S. at 121 ("A federal court must examine each claim in a case to see if the court's jurisdiction over that claim is barred by the Eleventh Amendment."). To begin, there can be no doubt that Plaintiffs' suit is against the State. The suit names each commissioner "solely" in that commissioner's "official capacity" and the Secretary of State "solely in her official capacity." Compl. ¶¶ 29, 32–44. The Defendants share the State's immunity under the doctrine that "a suit against a state official in his or her official capacity . . . is no different from a suit against the State itself." *Will v. Mich. Dep't of State Police*, 491 U.S. 58, 71 (1989).[3] The Commission exercises "legislative functions" as a department of the Michigan government. Mich. Const. art. IV, § 6(22). Because the Commission "is a state agency, and suits against officials in their official capacities are suits against the state," sovereign immunity applies. *Koch v. Dep't of Nat. Res.*, 858 F. App'x 832, 835 (6th Cir.), *cert. denied*, 142 S. Ct. 241 (2021). The Secretary of State enjoys the same immunity. *See, e.g.*, *Malnes v. Arizona*, 705 F. App'x 499, 500 (9th Cir. 2017).

Nor can there be any serious doubt that Count II alleges violations of Michigan law. The Complaint could not be more explicit in alleging that the Chestnut Plan "fails to comply with or properly apply . . . criteria" enumerated in Article IV, Section 6 of the Michigan Constitution. Compl. ¶ 109. Although Count II intersperses alleged violations of the federal Equal Protection Clause, *id.* ¶¶ 99, 103, 118, 122, these assertions carry no significance apart from allegations concerning "state constitutional requirements, *id.* ¶ 121. The Complaint alleges that the "arbitrary boundary drawing" allegedly "in violation of the Fourteenth Amendment's equal-protection guarantee" is a "failure" in the "respect" of the Commission's alleged non-

[3] Thus, there is no legal significance to the Complaint's assertion that the Commission is a "[n]on-party." Compl. ¶ 30. Because "[o]fficial-capacity suits . . . 'generally represent only another way of pleading an action against an entity of which an officer is an agent,' . . . an official-capacity suit is, in all respects other than name, to be treated as a suit against the entity." *Kentucky v. Graham*, 473 U.S. 159, 165–66 (1985) (citations omitted).

compliance with "neutral, and traditionally accepted, redistricting criteria . . . codified at Article IV, Section 6(13) of the Michigan Constitution." *Id.* ¶¶ 6–7; *see also id.* ¶ 106; PI Br. PageID.119, 122, 129-130 (alleging state-law violations in prominent headings).

Where pleadings assert state and federal violations in parallel, the question becomes "the extent to which *federal*, rather than State, law must be enforced to vindicate the federal interest." *Bragg v. W. Va. Coal Ass'n*, 248 F.3d 275, 293 (4th Cir. 2001) (quotation marks omitted). For example, the three-judge court in *Alabama Legislative Black Caucus* rejected an equal-protection claim lacking any identified standard other than "the whole-county provisions of the Alabama Constitution," concluding "that we lack the subject-matter jurisdiction to entertain a claim that state officials violated state law." 988 F. Supp. 2d at 1304. Count II is no different. It calls for relief that would, in effect, "instruct[] state officials on how to conform their conduct to state law." *Pennhurst*, 465 U.S. at 106.

2. The Equal Protection Clause Does Not Mandate Traditional Redistricting Criteria

Count II, in addition, has no federal constitutional underpinnings. No authority holds that "[a] Fourteenth Amendment Equal Protection violation arises when a legislature or commission implements traditional redistricting criteria in an inconsistent and arbitrary manner." Compl. ¶ 103; *see also* PI Br. PageID.119 (citing no authority for this rule). To the contrary, the Supreme Court has held that "[t]he Constitution does not mandate regularity of district shape." *Bush v. Vera*, 517 U.S. 952, 962 (1996) (plurality opinion); *see also id.* at 1000–01 (Scalia, J., concurring).

Plaintiffs misstate the significance of traditional districting principles. Courts "have recognized" these principles, PI Br. PageID.119, only for their *evidentiary* value in signaling independently significant constitutional harms, such as where a redistricting authority "subordinated traditional race-neutral districting principles . . . to racial considerations" subject to

strict scrutiny. *Miller v. Johnson*, 515 U.S. 900, 916 (1995). The Supreme Court has made clear that "[s]hape is relevant not because bizarreness is a necessary element of the constitutional wrong or a threshold requirement of proof, but because it may be persuasive circumstantial evidence that race for its own sake, and not other districting principles, was the legislature's dominant and controlling rationale." *Bethune-Hill v. Va. State Bd. of Elections*, 137 S. Ct. 788, 798 (2017) (quoting *Miller*, 515 U.S. at 798). "The Equal Protection Clause does not prohibit misshapen districts. It prohibits unjustified racial classifications." *Id.*

Thus, even if "maximizing compactness, respecting communities of interest, and ensuring that districts are contiguous all serve to limit various forms of gerrymandering and vote dilution," PI Br. PageID.119, the Constitution does not directly incorporate these principles. Even a "stark manifestation" of departure from traditional districting principles is not "a constitutional violation." *Miller*, 515 U.S. at 913. Plaintiffs' authorities outside the racial-gerrymandering context concern the "legislative policies might justify some variance" from equality of population in districts, *Karcher v. Daggett*, 462 U.S. 725, 740 (1983); *see also Larios v. Cox*, 300 F. Supp. 2d 1320, 1346–47 (N.D. Ga. 2004) (three-judge court), and the compactness threshold requirement governing Section 2 Voting Rights Act claims, *see Thornburg v. Gingles*, 478 U.S. 30, 50–51 (1986) (plurality opinion). They cite no federal authority invalidating a redistricting plan solely for failure to satisfy a court's notion of good-government values.

Plaintiffs' theory cannot withstand *Rucho v. Common Cause*, 139 S. Ct. 2484 (2019), which held that claims of "partisan gerrymandering" are non-justiciable in federal court. *Id.* at 2494. In the process, it rejected the argument that "fairness should be measured by adherence to 'traditional' districting criteria, such as maintaining political subdivisions, keeping communities of interest together, and protecting incumbents." *Id.* at 2500. The Court explained the problem with constitutionalizing these principles:

> If compliance with traditional districting criteria is the fairness touchstone, for example, how much deviation from those criteria is constitutionally acceptable and how should mapdrawers prioritize competing criteria? Should a court "reverse gerrymander" other parts of a State to counteract "natural" gerrymandering caused, for example, by the urban concentration of one party? If a districting plan protected half of the incumbents but redistricted the rest into head to head races, would that be constitutional? A court would have to rank the relative importance of those traditional criteria and weigh how much deviation from each to allow.

Id. at 2501. Thus, the Court again dismissed the notion that traditional districting principles are constitutionally mandated; it endorsed a prior opinion of Justice Kennedy concluding that "traditional criteria such as compactness and contiguity 'cannot'" be "'used as the basis for relief,'" *id.* at 2500 (quoting *Vieth v. Jubelirer*, 541 U.S. 267, 308 (2004) (Kennedy, J., concurring in the judgment)); and it reiterated the Court's prior rejection of a challenge to a Pennsylvania congressional plan, even though "Pennsylvania's legislature 'ignored all traditional redistricting criteria, including the preservation of local government boundaries,'" *id.* at 2498 (quoting *Vieth*, 541 U.S. at 272–73 (plurality opinion)). The traditional-districting-principles argument gained traction only in the dissent, which argued that fairness should be measured "[u]sing the criteria the State itself has chosen." *Rucho*, 139 S. Ct. at 2521 (Kagan, J., dissenting).

It is of no moment that Plaintiffs are not arguing that the Commission's "intent was to discriminate against voters who supported" a given party's candidates, as the plaintiffs in *Rucho* argued. *Id.* at 2492 (citation omitted). That only makes for a weaker equal-protection claim. If traditional districting principles cannot serve as a baseline "to measure how extreme a partisan gerrymander is," *id.* at 2505, they certainly cannot be enforced in federal court by their own terms. The problem in *Rucho* was that there are no "judicially manageable standards for deciding" gerrymandering claims, *id.* at 2491, and the Supreme Court has concluded that

"[t]raditional redistricting principles . . . are numerous and malleable." *Bethune-Hill*, 137 S. Ct. at 799. They are no more manageable here than in *Rucho*.[4]

Besides, Plaintiffs' claim is, on its face, just a watered-down claim of "gerrymandering," as they themselves put it. PI Br. PageID.119. They contend that traditional districting principles ensure that voters are "selecting a candidate that can represent both the individual's interests and the common interests of the community within the district," Compl. ¶ 110; that voters' "right to vote is" is protected, as is "their right to associate with their fellow citizens to advance the interests of the community, township, and county," *id.* ¶ 113; that "voters will be able to elect candidates who can represent the interests of both the individual and the community," *id.* ¶ 118; and that voters' "expression of an individual's preference for a congressional representative" will be recognized, *id.* ¶ 119. These are non-justiciable policy arguments with no connection to the Constitution. Because Plaintiffs do not argue that the Chestnut plan was "motivated by a racial purpose or object," *Miller*, 515 U.S. at 913,[5] and because Count II does not rely on any recognized vote-dilution or denial standard, the claim must be dismissed.

3. Plaintiffs Misinterpret the Michigan Constitution

Count II also lacks merit under state law. Subsection 13 of Article IV, Section 6 establishes seven criteria ranked "in order of priority." Mich. Const. art. IV, § 6(13). Plaintiffs ask the Court to rewrite the priority. No court enjoys that license.

[4] Plaintiffs' passing reference to "the First Amendment," PI Br. PageID.121, also invokes a theory rejected in *Rucho*. *See* 139 S. Ct. at 2504.

[5] In fact, the Michigan Supreme Court recently held that the Commission correctly avoided racial classifications. *Detroit Caucus v. Indep. Citizens Redistricting Comm'n*, --N.W.2d--, 2022 WL 329915 (Mich. Feb. 3, 2022).

The cornerstone of Plaintiffs' state-law attack is that the third-ranked criterion, "communities of interest," Mich. Const. art. IV, § 6(13)(c), refers to "counties, cities, and townships," PI Br. PageID.124; *see also id.* at PageId.123. Plaintiffs, in turn, contend that the Chestnut plan "unnecessarily contravene[s] some traditionally understood communities of interest," PI Br. PageID.127, and that their alternative plan "reduce[s] the number of split counties" and "the number of ways in which split counties are divided," PI Br. PageID.128, which Plaintiffs interpret to mean the Commission violated Subsection 13(c).

The problem with Plaintiffs' argument is "the plain meaning of the text at the time of ratification." *Adair v. Michigan*, 860 N.W.2d 93, 99 (Mich. 2014). The Constitution plainly provides that "[c]ommunities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests." Mich. Const. art. IV, § 6(13)(c). Not only does this text not limit the Commission to political-subdivision lines, it expressly authorizes the Commission to consider communities of interest from other perspectives, expansively defined.

Additional textual indicia bear this out. First, Subsection 13(c) is not limited to "communities of interest," as Plaintiffs would have it. Instead, Subsection 13(c) provides that "[d]istricts shall reflect *the state's diverse population and* communities of interest." Mich. Const. art. IV, § 6(13)(c) (emphasis added). Even if the phrase "communities of interest" were restricted to political subdivisions, Plaintiffs have not shown that the phrase "diverse population" is so limited. Second, Subsection 13 provides for "consideration of county, city, and township boundaries" in a *lower-ranked* criterion. Mich. Const. art. IV, § 6(13)(c). Plaintiffs acknowledge this by lodging an objection under this criterion as well, PI Br. PageID.129, but they fail to explain how the phrase "communities of interest" means nothing but "counties, cities, and townships," PI Br. PageID.124, when the Constitution separately references

"county, city, and township boundaries," Mich. Const. art. IV, § 6(13)(c). Michigan courts read text "in the light of the document as a whole," *In re Request for Advisory Op. Regarding Constitutionality of 2005 PA 71*, 740 N.W.2d 444, 462–63 (2007), but Plaintiffs rip the phrase "communities of interest" from context and alter the order of priority of the criteria, moving political-subdivision lines up three spots in ranking.

Plaintiffs' contrary positions are unpersuasive. Plaintiffs' contention that "roughly half a century of Michigan Supreme Court caselaw" treats "counties, cities, and townships" as "the primary communities of interest," PI Br. PageID.124, ignores that common-law doctrines "must give way to the Constitution to the extent they are 'repugnant' to it." *Detroit News, Inc. v. Indep. Citizens Redistricting Comm'n*, --N.W.2d--, 2021 WL 6058031, at *7 (Mich. Dec. 20, 2021) (quoting Mich. Const. art. III, § 7). The Michigan Supreme Court recently held that Article IV, Section 6 of the Michigan Constitution abrogates the Commission's attorney-client privilege, even though that privilege "is the oldest of the privileges for confidential communications and is founded upon . . . necessity . . . ." *Id.* at *6–7 (quotation marks omitted). So too here.

Plaintiffs also complain that the Constitution's definition of communities of interest affords the Commission too much discretion. *See* PI Br. PageID.123. But that is by constitutional design. The phrasing itself—identifying what communities of interest "may include, but shall not be limited to," Mich. Const. art. IV, § 6(13)(c)—exudes discretion. Further, the constitutional framework circumvents mischief by controlling the Commission's composition, its access to public input, and its adoption of a plan. The Constitution creates "a detailed procedure for the selection of commissioners," to, inter alia, exclude "individuals with current or recent political connection." *Daunt v. Benson*, 999 F.3d 299, 304, 311 (6th Cir. 2021). It also requires the Commission to hold at least 10 public hearings before drafting a single plan, to

conduct at least five more public hearings after drafting plans, to convene all its sessions in public with the opportunity for public input, and to publish all plans subject to a vote in a 45-day notice-and-comments process. Mich. Const. art. IV, § 6(8), (9), (10), (14)(b). At every step it must "conduct its hearings in a manner that invites wide public participation throughout the state." *Id.* art. IV, § 6(10). Then, at the voting stage, the Constitution requires plans to receive support from at least two commissioners of each party and two independent commissioners, at least at the initial stage of voting. *Id.* art. IV, § 6(14).

The broad discretion the Commission is afforded in defining communities of interest makes sense in this larger context. The Constitution creates a trustworthy selection process, maximizes both public input and commissioner agreement to enact a plan, and then affords discretion to the Commission to utilize the information made available to it. The proponents of Proposition 18-2 represented in the ratification debates that members of the public would be able to "tell the Commission how they want their communities defined through a series of public hearings and online before any maps are drawn." VNP FAQ Website. ("What are communities of interest and how will the Commission incorporate them into the maps?").[6] The Commission's ability to account for idiosyncratic concerns expressed by members of different communities is a feature of the constitutional framework, not a bug. There is no basis in the constitutional text for a court—especially a federal court—to usurp the Commission's role.

[6] Michigan precedent looks to "the circumstances surrounding the adoption of the provision and the purpose sought to be accomplished by the provision" to ascertain its meaning. *Taxpayers for Mich. Const. Gov't v. Dep't of Tech. , Mgmt. & Budget*, --N.W.2d--, 2021 WL 3179659, at *6 (Mich. July 28, 2021).

B. Count I

Plaintiffs' one-person, one-vote claim also has minimal prospects of success. The deviation challenged here is less than one fifth the size of the deviation the Supreme Court approved in *Tennant* and is justified by the Commission's legitimate—indeed, compelling—redistricting goals. Plaintiffs' contrary arguments show not that the Commission could have achieved *its* goals at lower population deviation, but that the Commission could have achieved *Plaintiffs'* goals at a lower population deviation. That is not the right analysis.

1. The Chestnut Plan Satisfies the Equal-Population Rule

The Supreme Court has interpreted Article I, Section 2 of the U.S. Constitution to require that congressional districts be "as nearly as is practicable one man's vote in a Congressional election it to be worth as much as another's." *Wesberry v. Sanders*, 376 U.S. 1, 7–9 (1964). This "standard does not require that congressional districts be drawn with 'precise mathematical equality,' but instead that the State justify population differences between districts that could have been avoided by 'a good-faith effort to achieve absolute equality.'" *Tennant v. Jefferson Cnty. Comm'n*, 567 U.S. 758, 759 (2012) (quoting *Karcher*, 462 U.S. at 730 (1983)). The claim is governed by a "two-part test." *Id.* at 760. "First, the parties challenging the plan bear the burden of proving the existence of population differences that 'could practicably be avoided.'" *Id.* (citation omitted). "If they do so, the burden shifts to the State to 'show with some specificity' that the population differences 'were necessary to achieve some legitimate state objective.'" *Id.* (citation omitted).

a. Count I Fails at Step One

Plaintiffs have not proven that the population deviation of 0.14% could practicably be avoided. It is not correct that "[t]he alpha and omega of this prong is" Plaintiffs' illustrative plan. PI Br. PageID.116.

First, that plan was not presented to the Commission, and Plaintiffs point to no evidence that the Commission had before it a plan with a deviation below 0.14%, as occurred in *Karcher* and *Tennant*. *Karcher*, 462 U.S. at 738 ("[S]everal other plans introduced in the 200th Legislature had smaller maximum deviations than the [Adopted] Plan."); *Tennant*, 567 U.S. at 760–61 ("[T]he State conceded that it could have adopted a plan with lower population variations," because a plan before the legislature "achieved a population difference of a single person"). This *post hoc* showing sheds no light on whether "real differences among the districts" "could have been avoided or significantly reduced with a good-faith effort to achieve population equality." *Karcher*, 462 U.S. at 738. *Karcher* rejected the notion "that a plan cannot represent a good-faith effort whenever a court can conceive of minor improvements." *Id.* at 740 n.10. Plaintiffs here show that they conceive of minor improvements, not that the Commission did or could have.

Second, Plaintiffs do not account for the Census Bureau's new policy called "Differential Privacy," which "injects a calibrated amount of noise into the raw census data to control the privacy risk of any calculation or statistic." *Alabama v. United States Dep't of Com.*, -- F. Supp. 3d--, 2021 WL 2668810, at *3 (M.D. Ala. June 29, 2021). For the first time in census history, the Bureau determined that, for the 2020 census, its legal obligation to protect confidentiality of census responses obligated it to inject small amounts of error into results—including the reported census-block-level population counts—"to obscure the presence or absence of any individual (in a database), or small groups of individuals, while at the same time preserving statistical utility." Exhibit D, Census Bureau, *Disclosure Avoidance for the 2020 Census*, 6 (November 2021).[7] The Bureau therefore warns that "[d]ata for very small geographic

[7] Available at https://www2.census.gov/library/publications/decennial/2020/2020-census-disclosure-avoidance-handbook.pdf (last accessed Feb. 18, 2022).

areas, such as census blocks, may be noisy," i.e., inaccurate. *Id.* at 2. And academics have concluded that this purposeful error "affects the ability to draw redistricting maps that adhere to [the] equal population principle" and renders population deviations, measured in small increments, to be of "of unknown magnitude." Exhibit E, Christopher T. Kenny, et al., *The use of differential privacy for census data and its impact on redistricting: The case of the 2020 U.S. Census*, Science Advances 6 (Oct. 6, 2021).[8] Plaintiffs cannot show that an alternative plan differing from the Chestnut plan only by a few hundred individuals is any more accurate, given the noise in the underlying data that impacts these very small differences.

To be sure, *Karcher* rejected the argument that the first prong is not met where a challenged plan's deviation "is smaller than the predictable undercount in available census data." 462 U.S. at 731. But the argument here is fundamentally different. The problem is not "the mere existence of statistical imprecision," *id.* at 735, but the purposeful introduction of inaccuracy in the census results that render small differences impossible to distinguish from each other. As in *Abrams v. Johnson*, 521 U.S. 74 (1997), where "population shifts and changes" after the decennial census rendered "the tinkerings [the challengers] propose[d]" "futile" because the number were slightly inaccurate "in any event," *id.* at 100, the Bureau here as introduced small doses of inaccuracy rendering a dispute over about 1,000 residents immaterial. Without question, it is now impossible to claim absolute population equality in any plan drawn using census data. The bullseye for population equality cannot be smaller than the diameter of the target arrow.

[8] Available at https://imai.fas.harvard.edu/research/files/DAS.pdf (last accessed Feb. 18, 2022).

b. Count I Fails at Step Two

The deviation of 0.14% is amply justified by "legitimate state objective[s]." *Tennant*, 567 U.S. at 760 (citation omitted). The Commission's "burden is a 'flexible one, which 'depends on the size of the deviations, the importance of the State's interests, the consistency with which the plan as a whole reflects those interests, and the availability of alternatives that might substantially vindicate those interests yet approximate population equality more closely." *Id.* (citation and edit marks omitted). This standard acknowledges that "redistricting 'ordinarily involves criteria and standards that have been weighed and evaluated by the elected branches in the exercise of their political judgment,'" and that federal courts must "defer to [such] state legislative policies, so long as they are consistent with constitutional norms, even if they require small differences in the population of congressional districts." *Id.* at 760 (quoting *Perry v. Perez*, 565 U.S. 388, 393 (2012) (per curiam), and *Karcher*, 462 U.S. at 740). The Chestnut plan satisfies this test.

Size of the Deviations. The starting point is the "size of the deviations." *Tennant*, 567 U.S. at 760 (citation omitted). The Chestnut plan has a deviation of 0.14%. By comparison, *Tennant* ruled that a deviation more than five times as large, 0.79%, was "small." 567 U.S. at 765. The Chestnut plan's even smaller deviation requires even less justification than was provided in *Tennant*. *See Larios*, 300 F. Supp. 2d at 1356 ("The showing required to justify population deviations is proportional to the size of the deviations.").

Importance of the Interests. The State's interests are of the highest magnitude. The State Constitution obligated the Commission to make an assessment of "the state's diverse population and communities of interest" according to a broad array of factors, drawing on information received at 139 meetings and hearings open to the public across the State, and craft districts to "reflect" those interests. Mich. Const. art. IV, § 6(13)(c). This is "clearly a

valid, neutral state policy." *Tennant*, 567 U.S. at 764; *see, e.g.*, *Abrams*, 521 U.S. at 100 (holding that "communities of interest," inter alia, justified deviation in court-drawn plan of 0.35%).

The Commission carried out its constitutional mandate, crafting each district around communities of interest identified through months of hearings and weeks of deliberations:

- District 1 unites northern Michigan's communities of interest including in the Upper Peninsula and the northern rural counties, including Native American communities. Eid Decl. ¶ 5.
- District 2 creates a mid-Michigan district of rural communities of interest, including Barry County and other farming communities that share culture and political needs. *Id.* ¶ 6. This configuration was supported by Republican commissioners who desired to see it in the final map. *Id.*
- District 3 was oriented around a community of interest shared by Grand Rapids, Muskegon, Grand Haven, and Rockford, which public commenters identified as sharing a common identity. *Id.* ¶ 8.
- District 4 establishes a western Michigan district that also unites Battle Creek and Kalamazoo, and this choice also was informed by public comments that these two communities—which are joined by a common highway—would best be served in the same district and by the input of Commissioner Orton, who is familiar with the region. *Id.* ¶ 10.
- District 5 joins communities on Michigan's southern border, which yet again was the product of residents' comments attesting that these rural areas share unique interests of border communities that engage in frequent intercourse with neighboring states. *Id.* ¶ 12.
- District 6 links Ann Arbor, Washtenaw County, and the University of Michigan with suburban communities in Detroit, most notably in Novi, whose culture, according to public commenters, is akin to Ann Arbor's. *Id.* ¶ 14. Another purpose was to separate

Washtenaw County from Jackson and Livingston Counties, which public commenters attested do not share common interests. *Id.*

- District 7 unites a tri-county area of Clinton, Eaton, and Ingham Counties around Lansing, based on overwhelming public comment supporting the configuration and complaining that the tri-county area was split in the 2011 redistricting plan. *Id.* ¶ 16.
- District 8 was drawn to maintain Midland County as whole as possible by excluding only a few sparsely population sections of the county. *Id.* ¶ 18.
- District 9 is centered around the so-called thumb area north and west of Detroit on Lake Huron, which shares a rural community of interest. *Id.* ¶ 20.
- District 10 was drawn to preserve communities of interest between Rochester Hills and the Macomb County communities of Sterling Heights, Warren, and St. Clair Shores, which share cultural communities. *Id.* ¶ 22.
- District 11 encompasses communities of interest in and around Oakland County, such as the cities of Wixom, Walled Lake, Commerce, West Bloomfield, Troy, and Farmington Hills, identified by a meticulous review of neighborhood similarities and differences. *Id.* ¶ 24. For example, the Commission strove to keep together an LGBTQ community of interest in the Ferndale, Royal Oak, and Oak Park neighborhoods and to exclude Southfield, whose residents stated a closer affinity with Detroit than with Oakland County. *Id.*
- District 12 creates a districting centered on the east side of Detroit and joining that area with similar communities, and the Commission also chose to include Livonia because its blue-collar workforce aligned with District 12's communities in Detroit, Dearborn, and Southfield. *Id.* ¶ 26. Commissioners familiar with Detroit had extensive input in the configuration to keep neighborhoods together based on their shared interests. *Id.*

- District 13 establishes a Detroit-centered district, and the configuration also preserves the townships of Wayne and southern portions of Dearborn Heights. *Id.* ¶ 28.

These configurations consist of innumerable choices made with an enormous quantity of public input. The Chestnut map originated in "heat" maps created identifying communities of interest based on a methodological gathering of public comments, and it evolved over the course of months through the collaborative effort of many commissioners and by reference to thousands of public comments, including at packed public auditoriums around Michigan and through online portals. *Id.* ¶ 4. There can be no serious question that the State's interest in listening to its citizens and incorporating their will is a *compelling* state interest, not to mention a "valid" one. *Tennant*, 567 U.S. at 764.

Consistency. The consistency element also weighs in the Commission's favor. *See Tennant*, 567 U.S. at 760. As shown, each of the 13 congressional districts was configured to achieve legitimate communities-of-interest goals, informed by the comprehensive hearings held in a systematic manner around the state and enabling the broadest possible participation. No district or region was excepted, and Commissioner Eid attests that he is unaware how he the Chestnut plan could have achieved the Commission's goals at a lower population deviation. Eid Decl. ¶ 30.

To be sure, each district does not achieve the *same* communities-of-interest objective, but to require this would replace a "flexible" burden with an inflexible one. *Tennant*, 567 U.S. at 760. Obviously, every district cannot contain Ann Arbor or unite the western shoreline, and the governing framework requires no such thing. The standard recognizes "that redistricting 'ordinarily involves criteria and standards that have been weighed and evaluated by the elected branches in the exercise of their political judgment,'" so it cannot be construed to preclude that judgment. *Tennant*, 567 U.S. at 760 (citation omitted). In *Tennant*, the Supreme

Court recognized that a state's "interest in limiting the shift of population between old and new districts" can be achieved in numerous, idiosyncratic ways and rebuked a lower court's rigid criticism of *how* the West Virginia legislature went about achieving this goal. *Id.* at 764. Likewise, the goal of communities of interest necessarily involves bespoke treatment of districts and regions. The question is not whether a federal court can imagine different ways of achieving the goals, but whether the *state's* method was "nondiscriminatory." *Karcher*, 462 U.S. at 740. Plaintiffs do not even allege that the Commission selectively considered communities of interest or discriminated against particular regions of Michigan and no such allegation could be tendered.

Alternatives. As in *Tennant*, no alternative comes "close to vindicating . . . the State's legitimate objectives while achieving a lower variance." 567 U.S. at 765. Plaintiffs' sole alternative plan does not purport to achieve the Commission's actual communities of interest goals. Rather, Plaintiffs criticize the Commission's discretion under Michigan law, argue against its communities-of-interest choices, and ask this Court to deliver a novel and completely atextual reading of Subsection 13 under the guise of a one-person, one-vote ruling. PI Br. PageID.114-118. In this regard, the state-law errors undergirding Count II equally infect Count I, for reasons described at Section I.A.3, *supra*.

Predictably, Plaintiffs' alternative plan shows that *their* goals could be met with no population deviation not that the *Commission's* goals could be met in that way. For example:

- Plaintiffs overtly criticize District 5 and reject the Commission's careful design of uniting communities along the Ohio and Indiana border. PI Br. PageID.132-133. But the Commission chose this configuration because people who live in the region asked to be united in a single congressional district, telling the Commission they share the unique circumstance of working, shopping, and praying across state lines. Eid Decl. ¶¶ 12–13. Plaintiffs'

assertion that such a configuration had not been seen "since at least 1963," PI Br. PageID.132, ignores that Michiganders *changed* the redistricting process because they wanted redistricting to be done *differently*, not the same as before.

- Plaintiffs' alternative plan separates Battle Creek from Kalamazoo, overriding the Commission's determination that people in the region consider these cities to have similar interests and belong in one district. Eid Decl. ¶ 11.
- Plaintiffs' alternative plan includes Barry County with Grand Rapids, but the Commission heard testimony from that county's residents of that they wanted to be in a rural district, not with Grand Rapids. *Id.* ¶ 9.
- Plaintiffs' rendition of District 8 dismantles a carefully crafted compromise between Republican and Democratic commissioners in resolving competing views about handling Midland City and Midland County. *Id.* ¶ 19.
- Plaintiffs' alternative includes Wixom and Walled Lake with the upper thumb region, but these have no common interests. *Id.* ¶ 21.
- Plaintiffs' version of District 10 excludes Rochester Hills from the culturally similar Macomb County and resulted in the exclusion of Walled Lake, White Lake, Wixom, and Commerce from Plaintiffs' version of District 11, notwithstanding the stated desire of residents of these communities to be included in Oakland County. *Id.* ¶ 23.
- Plaintiffs' rendition of District 11 incorporates the Novi community, but the Commission viewed Novi as more culturally akin to Ann Arbor and so included it in District 6. *Id.* ¶ 25.
- Plaintiffs' version of District 12 excludes Livonia and includes it with the Ann Arbor area in District 6, which divides similar communities in Novi and Ann Arbor and joins different communities in Livonia and Ann Arbor. *Id.* ¶ 27.

These examples, which are only a portion of Plaintiffs' departures from the Commission's goals recorded in the Eid declaration, show that Plaintiffs did not even try to prove "the availability of alternatives that might substantially vindicate those interests yet approximate population equality more closely." *Tennant*, 567 U.S. at 760 (citation omitted). Commissioner Eid attests that he would not have voted for Plaintiffs' alternative, that it would not likely have achieved the requisite support on the Commission, and that it appears not to attempt to achieve the Commission's goals concerning communities of interest. Eid Decl. ¶¶ 29–33.

And there is more. Plaintiffs' zeal for equality population resulted in locality splits that are—viewed functionally—preposterous. Plaintiffs claim to have done a better job with political-subdivision splits, but the splits that do occur involve tiny handfuls of people—e.g., just 13 out of Southfield Township and 19 out of Ross Township. Exhibit F, Brace Decl. ¶ 18. This not only means that a handful of individuals have been isolated out of their communities, but also that these people will have different ballots and it will be possible to reverse engineer *their individual voting choices* based on precinct returns. *Id.* The Commission's locality splits make functional sense, and there are no instances of extremely small populations isolated from their political subdivisions. These and other facts, *see generally* Brace Decl., show the folly of single-minded population-equalizing exercise.

2. Plaintiffs' Arguments Are Unavailing

Plaintiffs' efforts to overcome the Commission's overwhelming evidentiary basis to support minimal population deviations are unpersuasive.

First, Plaintiffs contend that the Commission cannot justify any deviation because Subsection 13 prioritizes the "equal population" rule "as mandated by the United States Constitution[]." PI Br. PageID.117 (quoting Mich. Const. art. IV, § 6(13)(a)). But the United

States Constitution "does not require that congressional districts be drawn with 'precise mathematical equality.'" *Tennant*, 567 U.S. at 761. The Commission's criteria—which are not enforceable as such against the Commission in federal court—plainly permit "the State [to] justify population differences." *Id.* at 761.

Second, Plaintiffs suggest that the Commission can only justify population deviations with evidence linking each deviation to the State's interest. *See* PI Br. PageID.117. But *Tennant* reversed a district court for requiring precisely that. *See* 67 U.S. at 762–63 (rejecting lower court's view that a state must "create a contemporaneous record to show that [the] entire . . . variance—or even a discrete, numerically precise portion thereof—was attributable to the State's interest" (quotation marks omitted)). And, to the extent Plaintiffs suggest that only the state interests recognized in *Tennant* qualify, *Tennant* expressly held that the "list of possible justification [is] not exclusive." *See id.* at 764

Third, Plaintiffs' argument that their alternative "represents an improvement over the Commissioners' map," PI Br. PageID.117, is factually untenable. It was drawn in secret where the people of Michigan wanted their plans drawn in public. It ignores the entire corpus of public comments, where Michiganders passed a constitutional amendment demanding to be heard. Plaintiffs' plan defined communities of interest in flat contravention of the Michigan Constitution. It replaces the discretion of a constitutionally created body with the secret goals of a private interest group. And, as shown, it overtly rejects innumerable goals informed by a thorough and serious process inundated with public input. Michigan deserves better, and it received better with the Commission's plan.

II. The Equities, Standing Alone, Militate Against an Injunction

The equities in this case could hardly be more one-sided. On the one side of the scale are the miniscule population deviations that create an imperceptible impact on Plaintiffs' voting rights. On the other side, Plaintiffs ask this Court to compromise the integrity of Michigan elections, undermine its administration, risk an election meltdown impacting millions of voters, impose a plan adopted in secret in violation of the Michigan Constitution, and reject the work of a citizens Commission informed by 139 public hearings. The Court should have no trouble rejecting Plaintiffs' demands.

1. The equities analysis in an election case is governed by the *Purcell* principle, "which establish[es] (i) that federal district courts ordinarily should not enjoin state election laws in the period close to an election, and (ii) that federal appellate courts should stay injunctions when, as here, lower federal courts contravene that principle." *Merrill*, 2022 WL 354467, at *1 (Kavanaugh, J., concurring) (citing *Purcell*, 549 U.S. at 1). This principle, in fact, antecedes the *Purcell* decision by two generations, having its genesis in *Reynolds v. Sims*, 377 U.S. 533 (1964). *Reynolds* ruled that the lower court "acted wisely in declining to stay the impending primary election in Alabama," *id.* at 586, even though "[p]opulation-variance ratios of up to about 41-to-1 existed in the Senate, and up to about 16-to-1 in the House," *id.* at 545. That is larger than the population deviation at issue here by orders of magnitude.

"*Sims* has been the guidon to a number of courts that have refrained from enjoining impending elections," *Chisom v. Roemer*, 853 F.2d 1186, 1190 (5th Cir. 1988), "even in the face of an undisputed constitutional violation," *Sw. Voter Registration Educ. Project v. Shelley*, 344 F.3d 914, 918 (9th Cir. 2003); *see, e.g.*, *Chisom*, 853 F.2d at 1190 (vacating *Chisom v. Edwards*, 690 F. Supp. 1524 (E.D. La. July 7, 1988)); *Kilgarlin v. Martin*, 252 F. Supp. 404, 444 (S.D. Tex. 1966), *aff'd in relevant part sub nom. Kilgarlin v. Hill*, 386 U.S. 120 (1967) (February

2 was too late to implement remedy for that year's elections); *Cardona v. Oakland Unified Sch. Dist., Cal.*, 785 F. Supp. 837, 843 (N.D. Cal. 1992) (February 25 was too late to interfere with that year's elections); *Klahr v. Williams*, 313 F. Supp. 148, 152 (D. Ariz. 1970), *aff'd sub nom. Ely v. Klahr*, 403 U.S. 108 (1971); *In re Pa. Cong. Districts in Reapportionment Cases*, 535 F. Supp. 191, 195 (M.D. Pa. 1982); *Dillard v. Crenshaw Cnty.*, 640 F. Supp. 1347, 1362 (M.D. Ala.1986); *Watkins v. Mabus*, 771 F. Supp. 789, 805 (S.D. Miss. 1991); *Ashe v. Bd. of Elections in City of N.Y.*, 1988 WL 68721, at *1 (E.D.N.Y. June 8, 1988).

In cases where a lower court has chosen differently, "the Supreme Court" has consistently "stayed [that] district court's hand." *Chisom*, 853 F.2d at 1190; *see also Tennant*, 567 U.S. at 763 ("We stayed the district court's order . . . and now reverse."); *Karcher v. Daggett*, 455 U.S. 1303 (1982) (Brennan, J., in chambers) (issuing stay); *Gill v. Whitford*, 137 S. Ct. 2289 (2017) (same); *Rucho v. Common Cause*, 138 S. Ct. 923 (2018) (same); *North Carolina v. Covington*, 138 S. Ct. 974 (2018) (same); *Abbott v. Perez*, 138 S. Ct. 49 (2017) (same); *North Carolina v. Covington*, 137 S. Ct. 808 (2017) (same); *Perry v. Perez*, 565 U.S. 1090 (2011) (same); *Miller v. Johnson*, 512 U.S. 1283 (1994) (same); *Chabot v. Ohio A. Philip Randolph Inst.*, 139 S. Ct. 2635 (2019) (same); *Mich. Senate v. League of Women Voters of Mich.*, 139 S. Ct. 2635 (2019) (same); *Andino v. Middleton*, 141 S. Ct. 9 (2020) (same); *Clarno v. People Not Politicians Or.*, 141 S. Ct. 206 (2020) (same); *Little v. Reclaim Idaho*, 140 S. Ct. 2616 (2020) (same); *Republican Nat'l Comm. v. Democratic Nat'l Comm.*, 140 S. Ct. 1205 (2020) (same).

Merrill is just the Supreme Court's latest correction of this all-too-familiar error. There, the Supreme Court intervened both to stay a three-judge panel's redistricting injunction—issued nearly four weeks ago—and to take jurisdiction of the matter for itself. 2022 WL 354467. According to the two Justices whose votes were decisive, the strength of the *Purcell* principle, standing alone, compelled that result. *Id.* at *1–3 (Kavanaugh, J., concurring). The

principle, at a minimum, "heightens the showing necessary for a plaintiff to overcome the State's extraordinarily strong interest in avoiding late, judicially imposed changes to its election laws and procedures." *Id.* at *2. The fight in *Merrill* did not concern a few hundred voters, but the assertion—substantiated in extensive preliminary-injunction proceedings—that the federal Voting Rights Act commanded an additional majority-minority district. *Id.* at *5 (Kagan, J., dissenting) ("Staying [the lower court's] decision forces Black Alabamians to suffer what under that law is clear vote dilution.").

2. Plaintiffs' opening brief says nothing of *Purcell* and does not even cite it. PI Br. PageID.98, 134-135. Instead, Plaintiffs provide a perfunctory analysis bypassing all relevant authority and treating the equitable factors as automatically favoring an injunction merely if a constitutional violation is asserted. PI Br. PageID.134. As shown, that is profoundly wrong in the elections context.

Plaintiffs have since impliedly acknowledged this error. Two days after *Merrill* issued, they abruptly announced that *Purcell* is not only relevant to this case but "could have a large impact on the ability of this Court to grant relief." ECF No. 25 at PageID.427. That motion provided a discussion of *Purcell*, identified purported "factual issues present in this case," procedures necessary to implement an injunction (such as "remand[ing] this matter back" to the Commission), and the possibility "of a special master," and it cited redistricting case law on these matters.[9] *Id.* at 4–5. But why is none of that in Plaintiffs' opening brief? Courts "have consistently held . . . that arguments made . . . for the first time in a reply brief are waived." *Sanborn v. Parker*, 629 F.3d 554, 579 (6th Cir. 2010). It was established law long before "Justice Kavanaugh's position in *Caster* and *Milligan*" was issued, ECF No. 25 at PageID.427, that

[9] Oddly the motion refers to a "post-judgment process," *id.* at 5, but there is no possibility of a post-*judgment* process without a final *judgment*. The present motion is for *preliminary* relief.

courts are "*required to weigh*, in addition to the harms attendant upon issuance or nonissuance of an injunction, considerations specific to election cases and its own institutional procedures." *Purcell*, 549 U.S. at 4 (emphasis added).

3. Plaintiffs' cannot, in any event, overcome their "heighten[ed]" *Purcell* "showing." *Merrill* 2022 WL 354467, at *2.

a. *Election in Progress*. The "State's election machinery is already in progress," *Reynolds*, 377 U.S. at 585, such that "the changes in question are [not] feasible before the election without significant cost, confusion, or hardship," *Merrill*, 2022 WL 354467, at *2 (Kavanaugh, J., concurring). The deadline for candidates to collect signatures and file nominating petitions for accessing the primary ballot is April 19, 2022, Mich. Comp. Laws § 168.133, as Plaintiffs acknowledge in their motion to expedite (but not their preliminary-injunction brief), ECF No. 25 at PageID.424. That is the *deadline* for signatures to be *collected*, not when collection *starts*. To be valid, signatures must be from "registered electors *residing in the district*." Mich. Comp. Laws § 168.133 (emphasis added). It is already too late to change district boundaries.

And that is not the only deadline that cannot be met if a new plan is adopted *today* (which is itself impossible). Challenges are due to nominating petitions by April 22, Mich. Comp. Laws 168.552, the State constitutional deadline for absentee ballots to be made available to voters is June 23, Mich. Const. art. II § 4, the statutory deadline for ballots to be delivered to county clerks and overseas military voters is June 18, Mich. Comp. Laws 168.759a, *id.* at 168.714, and the primary is August 2. To meet those deadlines, the Michigan Bureau of Elections must use the governing redistricting plans to update Michigan's qualified voter file (QVF), which is an electronic list of all registered voters in the state. *Id.* at 168.509o. The QVF contains a list of the electoral district of residence for each voter—at every level of

government, e.g., Congress, state house and senate, local school board, county board, etc. The QVF must be updated when a new plan is released, and this took *six months* last decade. Exhibit G, Secretary Jocelyn Benson's Brief Regarding Election Administrative Implementation, *League of Women Voters v. Independent Citizens Redistricting* Commission, No. 164022 at *1 (Mich., Feb. 9, 2022).

Even if the Bureau started *today*, it would struggle to finish updating the QVF before the primary date, but that updating must be *complete* before ballots are printed in time for delivery in June. As in *Merrill*, Plaintiffs' demanded relief "would require heroic efforts by those state and local authorities in the next few weeks—and even heroic efforts likely would not be enough to avoid chaos and confusion." 2022 WL 354467, at *2 (Kavanaugh, J., concurring).

b. *Adopting a Remedy*. But the Bureau cannot start implementing any remedy today because there is no remedial plan in place today. The State is a long way off from being able to adopt a remedial plan.

First, it is Michigan's express public policy, enshrined in its Constitution, that "[i]n no event shall any body, except the [Commission] . . . , promulgate and adopt a redistricting plan or plans for this state." Mich. Const. art. IV, § 6(19). Plaintiffs' motion to expedite (but not their preliminary-injunction brief) acknowledges that federal courts defer to such policies and that this Court will be "required to remand this matter back to the" Commission if it issues an injunction. ECF No. 25 at PageID.427-428. The Commission, however, is subject to the State Constitution, which requires it to hold public hearings, post plans to be voted on in a 45-day notice-and-comment period, and achieve support for any enacted plan from all political wings of the Commission. Mich. Const. art. IV, § 6(9) and (14). An injunction issued today would likely result in, at best, a new plan in June.

Second, it is also not adequate for Plaintiffs to respond that "a special master" could draw Michigan's congressional plan. ECF No. 25 at PageID.428. For one thing, to replace a plan lawfully prepared by the Commission over a period of months, informed by 139 meetings and hearings open to the public and innumerable public comments, with a special master's plan would impose a severe injury on Michigan's paramount sovereign interests. That has been recognized since *Reynolds*. *See* 377 U.S. at 585–86. To do so at the *preliminary-injunction* stage would appear to be unprecedented. Courts routinely reject the notion that crafting a new redistricting plan is appropriate provisional relief. *See, e.g.*, *Pileggi v. Aichele*, 843 F. Supp. 2d 584, 596 (E.D. Pa. 2012) (taking it as a given that a redistricting plan could not be created and imposed at the preliminary-injunction stage and thus observed that preliminary injunction could take only the form of delaying an election); *Diaz v. Silver*, 932 F. Supp. 462, 468–69 (E.D.N.Y. 1996) (cataloguing cases rejecting Plaintiffs' demanded relief); *see also Cardona v. Oakland Unified Sch. Dist., Cal.*, 785 F. Supp. 837, 840 (N.D. Cal. 1992) (denying preliminary injunctive relief in redistricting case); *Kostick v. Nago*, 878 F. Supp. 2d 1124, 1147 (D. Haw. 2012) (same); *NAACP-Greensboro Branch v. Guilford Cnty. Bd. of Elections*, 858 F. Supp. 2d 516, 530 (M.D.N.C. 2012) (same); *Perez v. Texas*, 2015 WL 6829596, at *4 (W.D. Tex. Nov. 6, 2015); *Valenti v. Dempsey*, 211 F. Supp. 911, 912 (D. Conn. 1962); *Shapiro v. Berger*, 328 F. Supp. 2d 496, 501 (S.D.N.Y. 2004). A special master's plan is not the "status quo." *Adams v. Baker*, 951 F.3d 428, 429 (6th Cir. 2020). The Chestnut plan is the status quo.

For another thing, federal courts do not issue special-master plans instantaneously. Plaintiffs' motion to expedite (at 5) cites *Bethune-Hill v. Virginia State Board of Elections*, 368 F. Supp. 3d 872 (E.D. Va. 2019), which adopted a special master's remedy. But that decision

was issued eight months after the liability ruling, which in turn was issued after final judgment, *Bethune-Hill v. Va. State Bd. of Elections*, 326 F. Supp. 3d 128 (E.D. Va. 2018), and five years after the case was filed, *see id.* at 136.

Third, Plaintiffs' demand that this Court impose *their* plan as a remedy hardly merits comment. That would even be a more pronounced dignitary injury to Michigan's overriding interests, erase the Commission's months of hearing public input, contravene the State's express public policy, and take Michigan back to being governed by plans drawn in secret and divorced from Michiganders' voices.

c. *Plaintiffs' Dilatory Conduct*. Plaintiffs have "unduly delayed bringing the complaint to court." *Merrill*, 2022 WL 354467, at *2 (Kavanaugh, J., concurring). "[A] party requesting a preliminary injunction must generally show reasonable diligence." *Benisek*, 138 S. Ct. at 1944. Here, the Commission adopted the plan on December 28, 2021, PI Br. PageID.101, but Plaintiffs fail to explain why they did not sue until January 20, 2022, ECF No. 1, or move for an injunction until January 27, ECF No. 9. It could not have been for lack of knowledge of the claim. The Chestnut plan and its population deviations were posted for public comment in November 2021. A colorable one-person, one-vote injury is readily knowable for the same reason it is "easily administrable," i.e., there are "three readily determined factors—where the plaintiff lives, how many voters are in his district, and how many voters are in other districts." *Vieth*, 541 U.S. at 290 (plurality opinion). The basis of the alleged injury was clear in December 2021, but Plaintiffs' delay of weeks to seek injunctive relief squandered precious time necessary to their claim for provisional remedial relief in an election year. *See Benisek v. Lamone*, 138 S. Ct. 1942, 1945 (2018).

d. *No Obvious Right to Relief.* It also may be relevant that Plaintiffs cannot show that "the underlying merits are entirely clearcut in [their] favor." *Merrill*, 2022 WL 354467, at

*2 (Kavanaugh, J., concurring). Assuming *Purcell* is not "absolute and that a district court may *never* enjoin a State's election laws in the period close to an election," a plaintiff must at least meet a more demanding standard than typically applies to a preliminary injunction motion. *Id.* at *2. As in *Merrill*, Plaintiffs fail even under this "relaxed version of *Purcell*." *Id.* at *3. As shown above, the population deviation is less than one fifth the size of the deviation approved in *Tennant*, and the Commission has a robust fact-based defense.

Finally, assuming arguendo that there is a violation here, it would clearly have a minimal impact on the weight of votes, and Plaintiff's claim stands unrecognized by decades of Supreme Court and lower-federal-court jurisprudence. In the balance of equities, a deviation one fifth the size of the deviation approved in *Tennant* does not outweigh the paramount public and State interests in voting in an orderly election under the plan of the Commission the people created.

CONCLUSION

The motion should be denied.

Dated: February 18, 2022

Respectfully submitted,

/s/ David H. Fink

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CERTIFICATE OF COMPLIANCE

Pursuant to Local Rule 7.3(b)(ii), Counsel for the Commission certifies that this brief contains 10,572 words, as indicated by Microsoft Word 2021, inclusive of any headings, footnotes, citations, and quotations, and exclusive of the caption, cover sheets, table of contents, signature block, any certificate, and any accompanying documents.

Dated: February 18, 2022

/s/ David H. Fink
David H. Fink

CERTIFICATE OF SERVICE

I hereby certify that on February 18, 2022, a true and correct copy of the foregoing was filed via the Court's CM/ECF system and served via electronic filing upon all counsel of record in this case.

/s/Nathan J. Fink
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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

MICHAEL BANERIAN, et al.,

Plaintiffs,

v.

JOCELYN BENSON, et al.,

Defendants,

and JOAN SWARTZ MCKAY, et al.,

Intervenor-Defendants.

Case No. 1:22-CV-00054-PLM-SJB

DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

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Exhibit A – Ronald Liscombe & Sean Rucker, *Redistricting in Michigan Past, Present, and Future*, 99 Mich. Bar J. 18, 19–22 (Aug. 2020)

Exhibit B – VNP FAQ Website

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Exhibit D – Census Bureau, *Disclosure Avoidance for the 2020 Census* (November 2021)

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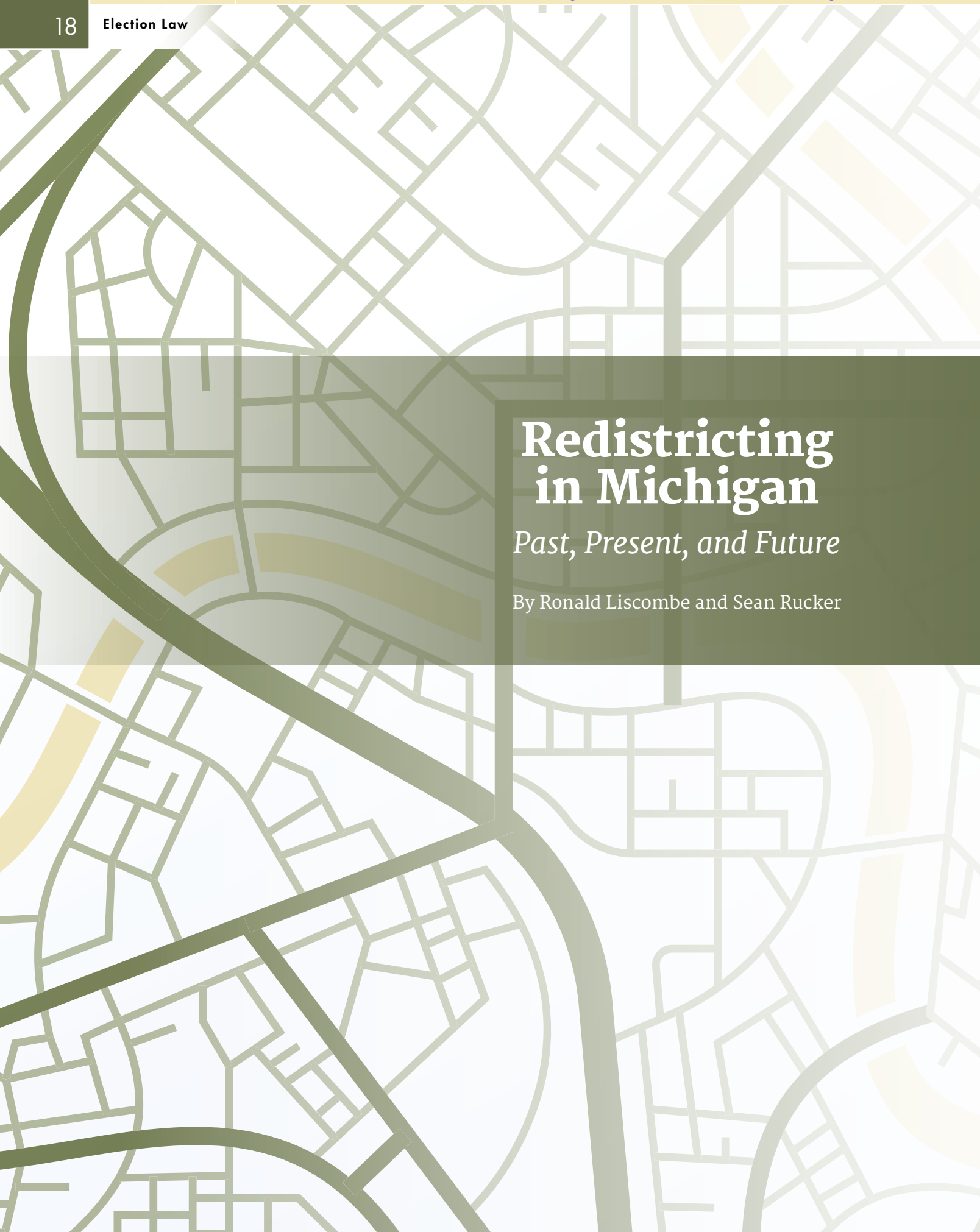
Exhibit F – Brace Declaration

Exhibit G – Secretary Jocelyn Benson's Brief Regarding Election Administrative Implementation, *League of Women Voters v. Independent Citizens Redistricting* Commission, No. 164022 (Mich., Feb. 9, 2022)

EXHIBIT A

EXHIBIT A



Redistricting in Michigan

Past, Present, and Future

By Ronald Liscombe and Sean Rucker

The year 2020 marks another United States Census. Michigan's population will be counted, and state legislative and congressional districts will be reapportioned in accordance with the results. This article explores the history of that process—known as redistricting—in Michigan and traces the evolution of and rules applicable to redistricting and apportionment from the adoption of the Michigan Constitution of 1963 to the passage of Proposal 2 in 2018, which amended the constitution to create an Independent Citizens Redistricting Commission that is responsible for redistricting following this year's census and beyond.

At a Glance

Assuming the process works as intended, the new redistricting plan mandated by the passage of Proposal 2 will create a far more fair and transparent redistricting and apportionment model; no longer will partisan politicians and their lobbyists and consultants wield primary responsibility and authority with respect to redrawing their own election districts. Instead, the constitutional amendment occasioned by Proposal 2's passage places the redistricting power in the hands of a balanced, diverse group of Michigan citizens.

Redistricting in Michigan before 1982

With respect to redistricting and apportionment, the Michigan Constitution of 1963 originally provided, in part, that:

> following the decennial census, the Commission on Legislative Apportionment shall establish House and Senate districts in accordance with rules there prescribed for districting and apportionment. If a majority of the commission cannot agree upon a reapportionment plan, then, upon submission of plans to this Court by members of the commission, this Court shall determine which plan complies most accurately with 'the constitutional requirements' and order its adoption.[1]

Substantively most important, the 1963 constitution prescribed a weighted land area/population formula for districting and apportioning; the constitutional provisions explicitly provided that "in districting the state for the purpose of electing senators, each county is assigned apportionment factors which are based on 20% on land area and 80% on population."[2] Redistricting for the election of House members was based on a similar formula.[3]

The redistricting paradigm immediately ran into trouble. In 1964, the United States Supreme Court held that a similar weighted land area/population formula violated the Equal Protection Clause of the Fourteenth Amendment to the United States Constitution.[4] This decision resulted in Michigan's redistricting process marching on in a bifurcated manner for the next two decades, with the Commission on Legislative Apportionment continuing to procedurally function.[5] Finally, in *In re Apportionment of State Legislature—1982*, the Michigan Supreme Court declared the entire scheme unconstitutional, holding that the procedural reapportionment provisions and the substantive criteria are "inextricably interdependent" and, thus, not severable.[6] Consequently, the Commission on Legislative Apportionment was disbanded.[7]

The Michigan Supreme Court's 1982 decision—in the absence of a new scheme implemented by the legislature or the people—also created a new redistricting and apportionment scheme to be provided "in compliance with federal constitutional requirements and in a manner most consistent with the constitutional history of this state."[8] The Court's new scheme, known as the Apol Standards after former Michigan director of elections Bernard Apol, provided for a divergence from the one person-one vote principle that had been at the heart of the original 1963 redistricting plan—within the federally mandated maximum population divergence range of 16.4 percent[9]—while adhering to the state's "constitutional history" of "commitments to contiguous, single-member districts drawn along the boundary lines of local units of government which, within those limitations, are as compact as feasible."[10]

Redistricting post-1982

After the Court's decision in *In re Apportionment of State Legislature—1982*, redistricting in Michigan was accomplished through a legislative process; following the results of the U.S. Census in 1990, 2000, and 2010, the legislature itself determined the redistricting plan with approval from the governor.[11] So long as the legislature's plan adhered to the Michigan Supreme Court's articulated guidelines, the legislature was essentially free to draw district maps as it saw fit. Given that the plan was established by the legislature following each census year, Michigan's redistricting scheme of the last three decades facilitated gerrymandering—defined as "the practice of dividing or arranging a territorial unit into election districts in a way that gives one political party an unfair advantage in elections"[12]—as the legislature often decided on rules and subsequently drew district maps to support the election of candidates of the controlling political party.[13]

Michigan's new redistricting scheme

Enter Voters Not Politicians (VNP), the nonpartisan, grassroots advocacy organization founded in 2017 to end the practice of partisan gerrymandering in Michigan. The group "works to strengthen democracy by engaging people across

Michigan in effective citizen action."[14] In 2018, VNP successfully placed a citizen-led ballot initiative before Michiganders in the November election; Proposal 2 was presented as a constitutional amendment to create an independent citizens redistricting commission to, as the group put it, "put the power to draw our election district maps in the hands of the voters—not politicians."[15]

Proposal 2 stated that it would, if passed, "establish a commission of citizens with exclusive authority to adopt district boundaries for the Michigan Senate, Michigan House of Representatives and U.S. Congress, every 10 years."[16] Proposal 2 further provided that it would:

- Create a commission of 13 registered voters randomly selected by the secretary of state: four each who self-identify as affiliated with the two major political parties and five who self-identify as unaffiliated with major political parties.
- Prohibit partisan officeholders and candidates, their employees, certain relatives, and lobbyists from serving as commissioners.
- Establish new redistricting criteria including geographically compact and contiguous districts of equal population, reflecting Michigan's diverse population and communities of interest. Districts shall not provide disproportionate advantage to political parties or candidates.
- Require an appropriation of funds for commission operations and commissioner compensation.[17]

On November 6, 2018, Proposal 2 passed with 61 percent of the vote.[18] It amended Article 4, Section 6 of the Michigan Constitution of 1963, most pertinently, by creating Michigan's Independent Citizens Redistricting Commission and mandating the following guidelines—in order of priority, as listed—for the drawing of district lines:

(a) Districts shall be of equal population as mandated by the United States Constitution, and shall comply with the voting rights act and other federal laws.

(b) Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part.

(c) Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristic or economic interests. Communities of interests do not include relationships with political parties, incumbents, or political candidates.

(d) Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness.

(e) Districts shall not favor or disfavor an incumbent elected official or a candidate.

(f) Districts shall reflect consideration of county, city, and township boundaries.

(g) Districts shall be reasonably compact.[19]

With respect to the first requirement—that the commission follow all federal laws related to redistricting—Proposal 2 requires the commission, in drawing district maps, to ensure that districts "contain close to an equal number of Michiganders to meet the 'equal population' requirement in the U.S. Constitution."[20] This "equal population" requirement is articulated in Article I, Section 2 of the U.S. Constitution, which requires that all districts be as nearly equal in population as practicable.[21] Additionally, the Equal Protection Clause of the Fourteenth Amendment applies to state legislative districts, mandating that they be substantially equal.[22] Further, the commission must adhere to the dictates of the Voting Rights Act, which provides that redistricting shall not result in dilution of minority votes.[23] While redistricting must be done in compliance with federal law, the commission is allowed under the Michigan Supreme Court's 1982 decision to diverge from the goal of equality of population to the extent necessary to achieve other rational goals as articulated in the criteria.[24]

According to VNP, the third criterion (communities of interest) means that the commission is "required to hold a series of public hearings to get feedback from real Michigan citizens about what they feel their shared values—also known as communities of interest—are."[25] The commission must "draw district lines while keeping shared cultural, historical, or economic interests in mind based on the feedback they receive from the public."[26]

Although VNP has provided guidelines, any articulation of what constitutes a community of interest in the relevant caselaw is opaque at best; the United States Supreme Court has discussed communities of interest but never provided a concrete definition or analytical framework. Indeed, the Court has opined that districts must be drawn to reflect "actual shared interests."[27] Further, it has provided that communities of interest are evidenced by "for example, shared broadcast and print media, public transport infrastructure, and institutions such as schools and churches."[28] Additionally, "socio-economic status, education, employment, health, and other characteristics" may factor into the applicable analysis.[29] Given that communities of interest have been vaguely articulated, courts are left to determine whether districts respect those communities on a case-by-case basis.

Commissioners must also ensure that there is no clear party advantage as a result of a potential redistricting plan.[30] Specifically, the commission may not "draw maps where a district gives an unfair or disproportionate advantage to any political party."[31] Nonetheless, the United States Supreme Court has held that "districting for some level of partisan advantage

Notably, the commission's working process includes extensive opportunities for public participation: The commission is required to hold at least 10 public hearings across the state before drawing maps and at least another five public hearings to present proposed maps before adoption.

is not unconstitutional"; determining that lines were drawn on the basis of partisanship does not indicate that the districting was improper. A permissible intent—securing partisan advantage—does not become constitutionally impermissible, like racial discrimination, when that permissible intent "predominates."[32] Further, the Court noted that it has "never struck down a partisan gerrymander as unconstitutional—despite various requests over the past 45 years."[33] While "excessive partisan gerrymandering" is "not condone[d]" by the Court, Chief Justice John Roberts noted that some level of partisan advantage is acceptable under the U.S. Constitution, concluding that the issue is best left to the states and observing Michigan's then-recent approval of Proposal 2.[34] With this in mind, it is unlikely that a judicial challenge to this provision would ultimately prove successful.

Finally, while the commission must draw districts that are reasonably compact, commissioners do have the authority to decide how they will measure compactness.[35]

Notably, the commission's working process includes extensive opportunities for public participation: The commission is required to hold at least 10 public hearings across the state before drawing maps and at least another five public hearings to present proposed maps before adoption. Commissioners must publicly present and publish why and how they drew maps that met the prescribed criteria. Michiganders also have the ability to submit their own maps to the commission for its required consideration.[36] Further, the commission must make all resources used during its meetings available to the public; this includes "reference documents, data, software used to draw maps, identity of consultants and staff, and any other information relating to the Commission's work."[37]

Seven of the 13 commissioners must vote to adopt a plan, and that majority must include at least two Democrats, two Republicans, and two unaffiliated commissioners.[38] Further, the commission shall publish the plan within 30 days after adoption.[39] An adopted redistricting plan becomes law 60 days after its publication.[40] Original jurisdiction is vested in the Michigan Supreme Court to direct the secretary of state or the commission to perform their respective duties and to review a challenge to any plan adopted by the commission, requiring a remand of the plan to the commission for further action if the plan fails to comply with applicable requirements.[41]

The future of redistricting in Michigan

As mentioned at the outset, the year 2020 marks another U.S. Census—the first since Proposal 2 passed—and the application process to be on Michigan's inaugural Independent Citizens Redistricting Commission wrapped up on June 1. The Michigan Secretary of State's Office has processed nearly 6,000 applications from registered voters in 82 of the state's 83 counties.[42] From those applicants, 200 finalists will be selected; finalists must consist of 60 voters who identify as Democrats, 60 who identify as Republicans, and 80 who identify as unaffiliated with either major political party.[43] The process will also use an algorithm (which will be publicly available) to ensure that the finalists reflect Michigan's age, gender, and racial composition, and that the state's geographical regions are proportionately represented.

Democrats and Republicans in the House and Senate each have the power to strike up to five applicants from the initial 200 finalists; by July 1, 2020, those 200 finalists will have been trimmed down to 180.[44] On September 1, 2020, the 13 commissioners will be selected by random drawing from the 180 remaining, and the commission will begin its work by October 15, 2020, to be completed in time for the 2022 election cycle.[45]

Assuming the process works as intended, the new redistricting plan mandated by the passage of Proposal 2 will create a far more fair and transparent redistricting and apportionment model; no longer will partisan politicians and their lobbyists and consultants wield primary responsibility and authority with respect to redrawing their own election districts. Instead, the constitutional amendment places the redistricting power in the hands of a balanced, diverse group of Michigan citizens. The Independent Citizens Redistricting Commission is bound to follow a public process in which it must present its work and proposed maps to the people, holding the commission accountable. Michiganders are now far more involved in the drawing of their election districts, and the state's electoral process—as well as its representative democracy—should be better for it. ■

Ronald Liscombe is a principal in Miller Canfield's Public Finance Group. He assists public-sector clients with a range of issues, including public finance and governance matters, and has deep knowledge of state and local government, having worked in a variety of policy and program management roles before joining the firm.

Sean Rucker is an associate in Miller Canfield's Public Finance Group. He also worked as a law clerk for Hon. Victoria A. Roberts in the United States District Court for the Eastern District of Michigan.

ENDNOTES

1. *In re Apportionment of State Legislature—1982*, 413 Mich 96, 105–106; 321 NW 2d 565 (1982) (citing Const 1963, art 4, § 6).
2. *Id.* at 107, n 3.
3. *Id.*
4. *Reynolds v Sims*, 377 US 533; 84 S Ct 1362; 12 L Ed 2d 506 (1964).
5. *In re Apportionment*, 413 Mich at 110–111.
6. *Id.* at 138–139.
7. *Id.*
8. *Id.* at 140.
9. *Id.* at 118, 142. See also *Mahan v Howell*, 410 US 315; 93 S Ct 979; 35 L Ed 2d 320 (1973).
10. *Id.* at 140.
11. *Redistricting in Michigan after the 2020 census*, Ballotpedia <https://ballotpedia.org/Redistricting_in_Michigan_after_the_2010_census> [https://perma.cc/V6PP-UAKU]. All websites cited in this article were accessed July 8, 2020.
12. Definition of "gerrymander," Merriam-Webster, available at <https://www.merriam-webster.com/dictionary/gerrymander>.
13. *Issues—Redistricting Matters*, League of Women Voters of Michigan <https://www.lwvmi.org/issues/redistricting.html> [https://perma.cc/GPC5-CVBD].
14. *About Voters Not Politicians*, Voters Not Politicians <https://votersnotpoliticians.com/> [https://perma.cc/WW4S-VF4F].
15. *We Ended Gerrymandering in Michigan*, Voters Not Politicians <https://votersnotpoliticians.com/redistricting/> [https://perma.cc/H7NE-J3R2].
16. *Proposal 2—100 Word Summary*, Voters Not Politicians <https://votersnotpoliticians.com/language/> [https://perma.cc/27VY-W8QM].
17. *Amendment Language*, Voters Not Politicians <https://votersnotpoliticians.com/language/> [https://perma.cc/GP6C-D35Q].
18. *We Ended Gerrymandering in Michigan*.
19. Const 1963, art 4, § 6.
20. *Redistricting Amendment Criteria*, Voters Not Politicians <https://votersnotpoliticians.com/redistricting-amendment-criteria/> [https://perma.cc/FW9Q-FBVY].
21. *Karcher v Daggett*, 462 US 725, 730; 103 S Ct 2653; 77 L Ed 2d 133 (1983).
22. US Const Am XIV, § 2.
23. *League of United Latin American Citizens v Perry*, 548 US 399, 425; 126 S Ct 2594; 165 L Ed 2d 609 (2006).
24. *Redistricting Amendment Criteria*.
25. *Id.*
26. *Id.*
27. *Miller v Johnson*, 515 US 900, 916; 115 S Ct 2475; 132 L Ed 2d 762 (1995).
28. *Bush v Vera*, 517 US 952, 964; 116 S Ct 1941; 135 L Ed 2d 248 (1996).
29. *League of United Latin American Citizens*, 548 US at 424.
30. *Redistricting Amendment Criteria*.
31. *Id.*
32. *Rucho v Common Cause*, 139 S Ct 2484, 2503; 204 L Ed 2d 931 (2019).
33. *Id.* at 2507.
34. *Id.*
35. *Redistricting Amendment Criteria*.
36. *Id.*
37. *Id.*
38. Const 1963, art 4, § 6(14).
39. Const 1963, art 4, § 6(15).
40. Const 1963, art 4, § 6(17).
41. Const 1963, art 4, § 6(19).
42. *Redistricting Commission Offers Break with Corrupt Past*, Detroit Free Press (May 24, 2020) <https://www.freep.com/story/opinion/editorials/2020/05/24/citizens-redistricting-commission-membership-deadline-michigan/5244685002/> [https://perma.cc/KJT3-48BM].
43. *Id.*
44. *Id.*
45. *Id.*

EXHIBIT B

EXHIBIT B

VOLUNTEER

DONATE

Michigan's redistricting reform amendment provides an exciting opportunity to engage the people of Michigan in a fair, impartial, and transparent redistricting process. Voters overwhelmingly decided to take the power of drawing our election district maps out of the hands of politicians and special interests and give it to the people through an **Independent Citizens Redistricting Commission**.

This process is new and unique to Michigan, so we know there will be questions along the way. Click on a frequently asked question below to learn more. You can read the full amendment language at here.

If you have any concerns or feedback, please email info@votersnotppoliticians.com.

Redistricting 101

- What is redistricting?
- What is "gerrymandering?"

Applying to Serve on the Commission

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- How long will Commissioners serve?
- Could my pension, social security or other benefits be affected by my salary earned from serving on the Commission?
- Am I eligible to serve if I was a partisan convention delegate?

The Map Drawing Process

- How will the Commission draw maps?
- How will ordinary citizens provide input in the new process?
- What are communities of interest and how will the Commission incorporate them into maps?

  - A community of interest is a geographically connected group of people with shared social or economic interests. They can be based on local economies, school districts, cultural ties, or other characteristics. At least 24 other states – both with independent commissions and without – incorporate communities of interest when they draw election maps.
  - The public will tell the Commission how they want their communities defined through a series of public hearings and online before any maps are

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Amendment?

How can a Commission represent ALL the people of Michigan's interests?

What ensures that Commissioners will act in a nonpartisan manner?

Protecting an Impartial Commission

What is the role of the Secretary of State in the proposed process?

How will the Commission be protected from the Legislature and the Executive branch?

What is the role of the Judiciary in the process?

How is the Commission protected against applicants misrepresenting themselves and gaming the system?

How is the Commission protected against Commissioners not doing their job?

Do other states have independent redistricting commissions?

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Voters Not Politicians is a 501(c)(4) organization dedicated to strengthening democracy in Michigan by engaging citizens in projects and initiatives across the state.

EXHIBIT C

EXHIBIT C

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

MICHAEL BANERIAN, et al., Plaintiffs, v. JOCELYN BENSON, et al., Defendants.	**Case No. 1:22-CV-00054-RMK-JTN-PLM**

DECLARATION OF ANTHONY EID

I, Anthony Eid, declare and state pursuant to 28 U.S.C. § 1746 as follows:

1. I am a Commissioner on the Michigan Independent Citizens Redistricting Commission.

2. I serve as a Commissioner unaffiliated with any major political party.

3. This declaration is given based on my personal knowledge concerning facts with which I am intimately familiar. I reviewed Exhibit D to the Brace Declaration (the "Map Comparison"), a map comparing the enacted congressional plan to Plaintiffs' proposed remedial plan, as part of preparing this declaration.

Role in Map-Drawing Process

4. I prepared the initial draft of the enacted congressional plan – called the Chestnut map – using community of interest heat maps facilitated through the work of Dr. Moon Duchin and the Metric Geometry and Gerrymandering Group ("MGGG") Redistricting Lab. These heat maps aggregate comments made by the public on corresponding portions of the map to provide information about concentrated communities of interest within the map, and are available to the public. I sponsored the Chestnut map through the collaborative map-drawing process. The people

of Michigan had the opportunity to, and did, give feedback on the chestnut map. Commissioners collaboratively edited the plan after the Commission's second round of public hearings. I was present during all Commission meetings when map-drawing decisions were made related to the Chestnut map. I supported the Chestnut map because the public response to the map indicated that the public preferred the Chestnut map because it most closely corresponded with Michigan's ranked redistricting criteria, it valued Michigan's communities of interest and diverse populations, and I believed it would be a map supported by the necessary votes among the Commissioners.

Congressional District 1

5. The goals in drawing Congressional District 1 were to preserve the northern regions of the State, including the Upper Peninsula and contiguous regions on the other side of Lake Huron which have similar features. They are sparsely populated counties that are more rural and agricultural in nature. The district also includes many Native American communites.

Congressional District 2

6. The goals in drawing Congressional District 2 were to create a mid-Michigan district that included Barry County with other rural communities in response to public comments from residents of Barry County. Individuals expressed that Barry County was a rural farming community that wanted to be included with other rural counties such as Ionia, Montcalm, Gratiot, and Isabella. I understood that the Republican Commissioners agreed with this formation and wanted to see it in the final map.

7. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 2 does not include Barry County with other rural counties and support rural communities of interest. I also notice in Plaintiffs' proposed Congressional District 2 that Muskegon is annexed

from Grand Rapids. The Commission heard many comments from the Muskegon and Grand Rapids community of interest, asking to be kept together because of shared cultural and economic values. Plaintiffs' Congressional District 2 divides this community of interest.

Congressional District 3

8. The goals in drawing Congressional District 3 were to preserve the communities of interest in Grand Rapids, Muskegon, Grand Haven, and Rockford. Residents of these communities indicated, through public comment, that they wanted to remain together.

9. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 2 includes rural Barry County, whose residents asked to remain with other rural communities, with the more urban Grand Rapids community. Plaintiffs' proposed Congressional District 3 does not include Muskegon with Grand Rapids. The Commission was asked to keep these two more urban communities together because of their shared values and cultural commonalities.

Congressional District 4

10. The goals in drawing Congressional District 4 were to create a western Michigan district while preserving the communities of interest in the Battle Creek and Kalamazoo area. Many individuals at public comment spoke about living in Battle Creek and working or shopping in Kalamazoo; individuals also spoke about a shared common highway between the two communities. Commission Orton, who is familiar with the Battle Creek area, helped identify the portions of Battle Creek that felt more closely aligned with Kalamazoo.

11. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 4 splits Battle Creek and Kalamazoo and includes Kalamazoo with counties bordering Michigan and Indiana. This configuration divides the community of interest identified along the

southern border of Michigan which were kept whole in the enacted plan's Congressional District 5.

Congressional District 5

12. The goals in drawing Congressional District 5 were to preserve the communities of interest along the southern border of Michigan. Residents of the southern counties that border Indiana and Ohio spoke to the Commission about the unique circumstances that align them. For example, many individuals spoke about living in Michigan but working, shopping, and praying across the border or dealing with interstate transportation. Additionally, we heard public comment about the community feeling connected by a shared television market.

13. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional 5 does not comport with our goals because it divides the southern border community of interest.

Congressional District 6

14. The goals in drawing Congressional District 6 were create a district around Ann Arbor, Washtenaw County, and the University of Michigan. Individuals made it clear through public comment that Jackson and Livingston Counties should not be included in a Congressional district with Washtenaw County, as they share different values. Since Washtenaw County does not contain enough population to make a congressional district by itself, the commission decided to add communities to this district that were similar in nature to Washtenaw County. The commission therefore decided to preserve the communities of interest between Novi and Ann Arbor. Individuals at public comment asked the Commission to include Novi with Ann Arbor based on shared commonalities, such as residents of Novi receiving services from the University of Michigan and Ann Arbor area. Additionally, Novi residents identified with Ann Arbor's white-collar workforce.

15. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 6 includes Livonia with Ann Arbor and splits the community of interest between Novi and Ann Arbor. The Commission heard during public comment that Livonia has more of a blue-collar workforce that is much more closely aligned with the communities in Detroit, Dearborn, and Southfield. The Commission decided to include Livonia with those communities as a result.

Congressional District 7

16. The goals in drawing Congressional District 7 were to create a tri-county district consisting of Clinton, Eaton, and Igham Counties while keeping Shiawassee County whole. The commission wanted to support the communities of interest within the tri-county area of Clinton, Eaton, and Ingham County in response to public comment. This community was split in the previous 2011 congressional map, and the citizens of the area made it clear that they wanted to be made whole as they are in the Chestnut map.

17. In reviewing the Map Comparison, I notice that Plaintiff's proposed Congressional District 7 splits Shiawassee County and includes portions of Barry County with the tri-counties. Plaintiffs' District 7 splits the rural community of interest in Barry County against the expressed interests described above in the formation of Congressional District 2.

Congressional District 8

18. The goals in drawing Congressional District 8 were to accommodate various communities of interest and draw a district that compromised on competing interests in and around Midland County. The Commission heard many comments asking the Commission to keep Midland County as whole as possible. Some individuals asked that Midland be included with Gladwin County, while others asked for Midland to be included with the cities of Flint, Bay City, and Saginaw. In an effort to compromise and create a map that would receive bipartisan support, the

Commission opted to keep Midland County as whole as possible by only excluding five sparsely populated portions of Midland County.

19. In reviewing the Map Comparison, I notice that Plaintiff's proposed Congressional District 8 split the City of Midland from the County of Midland. The Commission considered this kind of split in the proposed Birch map configuration. Ultimately, the Commission did not opt for this configuration, and I did not believe that this alternative configuration would receive the support of two Republican Commissioners (a requirement for selecting a map).

Congressional District 9

20. The goal in drawing Congressional District 9 was to create a district centered around the "thumb" of Michigan. This area identified as a community of interest due to its rural, agricultural nature. In doing so, the commission decided not to include the cities of Wixom, Walled Lake, and Commerce Township within this "thumb"-centered district. These cities identified as a community of interest with the southern portion of Oakland County. The Commission heard public comment that these communities identified much more closely with the suburban metro-Detroit portions of Oakland County than with the rural communities in Michigan's thumb area. I understood from Commissioner Vallette, a Commissioner from that area, that these communities were much more aligned with Oakland County than the rural, agricultural community in the thumb.

21. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 9 includes Wixom and Walled Lake with Michigan's upper thumb portion. This does not comport with our goals because these communities are very different and includes the suburban, metro-Detroit communities with rural, agricultural communities.

Congressional District 10

22. The goals in drawing Congressional District 10 were to preserve communities of interest between Rochester Hills and the Macomb County communities of Sterling Heights, Warren, and St. Clair Shores because of shared cultural communities. The areas share a large Chaldean population that the Commission worked to keep together. Additionally, Commissioner Clark, who resides in Rochester Hills, believed that Rochester Hills was more closely associated with the communities in Sterling Heights and St. Clair Shores in Macomb County.

23. In reviewing the Map Comparison, I notice that Plaintiffs' proposed Congressional District 10 excludes Rochester Hills from the closely aligned Macomb County communities and splits up that cultural community of interest. Plaintiffs' decision to include Rochester Hills in District 11, instead of Congressional District 10, resulted in the exclusion of Walled Lake, White Lake, Wixom, and Commerce from Plaintiffs' Congressional District 11. These communities indicated, through public comment, a desire to be included with Oakland County and felt more closely aligned with other communities in Oakland County.

Congressional District 11

24. The goals in drawing Congressional District 11 were to preserve communities in and around Oakland County such as the cities of Wixom, Walled Lake, Wixom, Commerce, West Bloomfield, Troy, and Farmington Hills. Many of these townships identified as a community of interest representing the core townships of Oakland County, and share economic, cultural, and historic similarities. The Commission also worked to preserve the LGBTQ communities in the cities of Royal Oak, Ferndale, and Oak Park. The Commission decided to exclude Southfield from Congressional District 11 because individuals expressed that Southfield felt more closely aligned with the communities of Detroit than Oakland County.

25. In reviewing the Map Comparison, I notice that Plaintiffs' proposed District 11 divides communities of interest by including the Rochester Hills area that asked to be included with portions of Macomb County and including the Novi area that expressed a desire to be included with Ann Arbor.

Congressional District 12

26. The goals in drawing Congressional District 12 were to create a district featuring the east side of Detroit with Dearborn and other similar communities, and to preserve the historical neighborhoods in and around Detroit. Commissioners Kellom and Curry, who were familiar with this area, made meaningful changes to the Detroit area to keep these neighborhoods together. The Commission also decided to include Livonia in Congressional District 12 because of Livonia's blue-collar workforce that aligned more with the communities in Detroit, Dearborn, and Southfield. The Commission worked to preserve township lines and followed the borders of Southfield and Livonia when drawing this District.

27. In reviewing the Comparison Map, I notice that Plaintiffs' proposed Congressional District 12 excludes Livonia from Congressional District 12 and includes it in Congressional District 6 with the Ann Arbor area. This decision splits up the community of interest between the Novi and the Ann Arbor area and includes the blue-collar workforce of Livonia with the white-collar workforce of Ann Arbor when these communities share little in common.

Congressional District 13

28. The goals in drawing Congressional District 13 were to create a Detroit centered district and to preserve the townships of Wayne and the southern portion of Dearborn Heights in order to keep minority communities whole.

* * * *

29. I never saw a plan that achieved the communities-of-interest goals of the Chestnut plan at a lower population deviation than the Chestnut plan.

30. I do not know how the Commission would have achieved all the communities-of-interest goals of the Chestnut plan at a lower population deviation.

31. Plaintiffs' alternative does not convince me that the Commission could have achieved all the communities-of-interest goals at a lower population deviation.

32. Plaintiffs' district configurations do not appear to try to achieve the Commission's goals concerning communities of interest.

33. I would not have proposed or voted for Plaintiffs' alternative plan.

I declare under penalty of perjury that to the best of my memory the foregoing is true and correct.

Executed this 18 day of February, 2022.

Anthony Eid

EXHIBIT D

EXHIBIT D

Disclosure Avoidance for the 2020 Census: An Introduction

Issued November 2021

United States® Census Bureau

U.S. Department of Commerce
U.S. CENSUS BUREAU
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Acknowledgments

Beth Jarosz, Program Director, U.S. Programs, Population Reference Bureau (PRB), **Mark Mather**, Associate Vice President, U.S. Programs, PRB, and **Linda A. Jacobsen**, Vice President, U.S. Programs, PRB, drafted portions of this handbook in partnership with the U.S. Census Bureau's 2020 Census Data Products and Dissemination Team.

Jason Devine, **Michael Hawes**, **Michele Hedrick**, **Cynthia Hollingsworth**, **Meghan Maury**, **Thomas Morton**, **Kimberly Quick**, **Letha Rubin**, **Matthew Spence**, and **James Whitehorne**, Census Bureau, contributed to the planning and review of the handbook.

The Data Products and Dissemination Operation is under the direction of **Albert E. Fontenot Jr.**, Associate Director for Decennial Census Programs, **Deborah M. Stempowski**, Assistant Director for Decennial Census Programs, and **Jennifer Reichert**, Division Chief, Decennial Census Management Division.

Other individuals from the Census Bureau who contributed to the review and release of this handbook include **John M. Abowd**, **Victoria A. Velkoff**, **Karen Battle**, **Philip Leclerc**, **Dan Kifer**, **Ryan Cumings**, and **Pavel Zhuravlev**.

Stacey Barber, **Corey Beasley**, **Faye Brock**, **Christine Geter**, and **Paula Lancaster** provided publication management, graphic design and composition, editorial review, and 508 compliancy for electronic media and print under the direction of **Linda Chen**, Acting Chief of the Graphic and Editorial Services Branch, Public Information Office.

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U.S. CENSUS BUREAU
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Suggested Citation

U.S. Census Bureau,
Disclosure Avoidance for the 2020 Census: An Introduction,
U.S. Government Publishing Office,
Washington, DC,
November 2021.

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1. DISCLOSURE AVOIDANCE FOR 2020 CENSUS REDISTRICTING DATA: AN INTRODUCTION

Background

What is disclosure avoidance and why does it matter? At the U.S. Census Bureau, disclosure avoidance is defined as a process used to protect the confidentiality of respondents' personal information. Since the 1990 Census, the Census Bureau has protected confidentiality by adding "noise"—or variations from the actual count—to the collected data.

In 2020, millions of Americans responded to the decennial census. The decennial census determines congressional apportionment, is often used by states for redistricting purposes, and informs the allocation of hundreds of billions of dollars in federal funding. The 2020 Census counted more than 331 million people in more than 140 million housing units.

The challenge for the Census Bureau is balancing the need to collect and report these data with the statutory obligation to protect their confidentiality.[1] The Census Bureau's work toward that balance is guided by our privacy principles including necessity, openness, respectful treatment of respondents, and confidentiality.[2]

For data users, the main challenge is understanding how disclosure avoidance works, how it may affect the 2020 Census results (Box 1-1), and how it differs from the disclosure avoidance performed on the 2000 Census and 2010 Census. This report provides an overview of how and why the Census Bureau is applying new disclosure avoidance techniques to the 2020 Census and some of the key implications for those who rely on the data.

Responses Are Protected by Law

The Census Bureau is bound by federal law to protect data provided by or on behalf of respondents and to keep them strictly confidential. Not only is this protection a legal and ethical responsibility, but it also underpins the public trust in the Census Bureau. That trust is critical to the public's willingness to respond to censuses and surveys, which in turn is critical to the quality of data that is central to our mission.

Title 13 of the U.S. Code prohibits the Census Bureau from disclosing any "information reported by, or on behalf of, any particular respondent" and from "[making] any publication whereby the data furnished by any particular establishment or individual under this title can be identified."[3] Office of Management and Budget (OMB) guidance on interpreting confidentiality standards further clarifies that federal agencies are required to consider the broader context of disclosure risk (known as the "mosaic effect") when performing their disclosure reviews: "Before disclosing potential PII or other potentially sensitive information, agencies must consider other publicly available data—in any medium and from any source to determine whether some combination of existing data and the data intended to be publicly released could allow for the identification of an individual or pose another security concern."[4]

In fact, every employee at the Census Bureau takes a lifelong oath to protect all respondent information gathered by the Census Bureau. This oath forms the cornerstone of the Census Bureau's broader culture of data stewardship.

Data stewardship is a comprehensive framework designed to protect information over the course of the information life cycle—from collection to dissemination—and it starts with a commitment to confidentiality that is required by law and designed to maintain public trust. Research conducted by both the Census Bureau and nongovernmental researchers has shown that concerns about privacy and confidentiality are among the reasons most often given by potential respondents for unwillingness to participate in surveys and censuses.[5, 6]

Many commercial vendors collect, sell, and publish data about people living in the United States. While these vendors have access to their own data on name, address, and date of birth, fewer vendors have access to the type of rich demographic data the census collects on characteristics like race, ethnicity, and household relationships.

The information on demographic characteristics that these vendors lack is precisely the sort of information collected by the decennial census. The disclosure of these types of characteristics could not only make it

[1] U.S. Constitution, Article I, Section 2; Title 13 U.S. Code, Sections 8–9; Title 13 U.S. Code, Section 141.

[2] "Our Privacy Principles," <www.census.gov/about/policies/privacy/data_stewardship/our_privacy_principles.html>.

[3] Title 13 U.S. Code, Sections 8–9.

[4] OMB Memorandum M-13-13, <https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf>, pp. 4–5.

[5] More information on research conducted by the Census Bureau is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/plan/final-analysis/2020-report-cbams-study-survey.html>.

[6] More information on nongovernmental researchers is available at <www.srl.uic.edu/newsletter/issues/2000s/04v35n2-3.pdf>.

Box 1-1. Disclosure Avoidance: Key Considerations for Data Users Working With 2020 Census Redistricting Data

In this handbook, the U.S. Census Bureau's Disclosure Avoidance System is described in the context of the 2020 Census Redistricting Data (P.L. 94-171) Summary File because those are the first 2020 Census data protected using the new privacy procedures. The apportionment counts released earlier, in April 2021, were not subject to these new privacy procedures and were the actual enumerated population counts for each state.

Here is a summary of key considerations and recommendations for data users working with the 2020 Census redistricting data:

- Data for very small geographic areas, such as census blocks, may be noisy and should be aggregated into larger geographic areas before use. (Note: this was also the case for 2000 Census and 2010 Census data.)
- Small population groups may experience larger relative uncertainty. While the absolute error is the same for all groups within the same table, the noise added to small groups will result in higher relative error because the underlying population (the denominator) is smaller. (Note: this was also the case for characteristics data in the 2000 Census and 2010 Census.)
- Counts are consistent within tables, across person tables (P1–P5), across the housing unit table (H1), and across geographies. For example, rows within a table sum up to the parent row and counts for geographic levels add up to totals for parent geographies.
- The disclosure avoidance methods for the redistricting data were designed to allow users to transform the published person-level tables by addition and subtraction across tables. For example, you can subtract Table P3 (voting-age population by race) from Table P1 (total population by race) to obtain the population under the age of 18 by race.
- For a given geography, particularly at the block level, the uncertainty introduced by disclosure avoidance may result in apparent inconsistencies between the population and housing tables, such as more occupied housing units than people.
- Data should not be divided across population and housing tables for small geographic areas such as block groups. For example, values from Table P2 should not be divided by values from Table H1 to obtain the average number of people per household. Users who need less noisy statistics on people per household should wait for the release of the Detailed Demographic and Housing Characteristics File (Detailed DHC).
- As with any census, noise infusion is not the only source of uncertainty in 2020 Census data. In most cases, these other sources of uncertainty in census data are more significant than the uncertainty due to confidentiality protection.[1]

The redistricting data files include certain "invariants"—data that are kept exactly as enumerated with no noise added. Invariant statistics for the 2020 Census redistricting data are:

- Total number of people in each state, the District of Columbia, and Puerto Rico.
- Total number of housing units in each census block.
- Number of occupied group quarters facilities by major group quarters type in each census block (e.g., correctional facilities, nursing facilities, college dorms, and military quarters).

All other population and housing characteristic data, including population counts for every geography below the state level, had noise introduced.

In addition to the invariants noted above, the Census Bureau applies the following additional constraints to the redistricting dataset:

- Population and housing counts must be integers and may not be negative.
- The voting-age population count must not exceed the total population count.
- Counts must be consistent within tables, across tables, and across geographies. For example, the population by race must sum to the total population, and the number of occupied and vacant housing units must sum to the total number of housing units.
- If there are zero housing units and zero group quarters facilities in a geography, then no people may be assigned to that geography.
- Blocks with group quarters facilities must include at least one person for each type of group quarters facility present.

[1] "2020 Census Data Quality," <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/data-quality.html#evaluating>; Declaration of John Abowd, U.S. Census Bureau, State of Alabama v. U.S. Department of Commerce, Appendix B, United States District Court for the Middle District of Alabama Eastern Division, filed April 13, 2021.

easier to target individuals—particularly in vulnerable populations—such as communities of color, same-sex couples, older adults, or parents of very young children—for fraud, enforcement actions, disinformation, or physical or virtual abuse, but it could also undermine the public's trust in the confidentiality of its census response, which could cause people to be less likely to respond to future censuses.

To protect information against disclosure in published tabulations, the Census Bureau uses disclosure avoidance procedures—techniques to disguise data to protect the confidentiality of those data.

Disclosure Avoidance Is Not New

Disclosure avoidance at the Census Bureau is not new. Figure 1.1 provides a summary overview of how census privacy protections have evolved from the 1930 Census to the 2020 Census.

For the 1930 Census, the Census Bureau stopped publishing certain tables for small geographic areas to avoid indirect disclosure. In 1954, privacy protection rules were consolidated into Title 13, U.S. Code. For the 1970 Census, the Census Bureau suppressed certain tables based on the number of people or households in a given area.[7]

In 1990, the Census Bureau began using more sophisticated techniques, such as data swapping, to protect against disclosure. With data swapping, the Census Bureau injects "noise" into the data by swapping records for certain households with those from households with similar characteristics in a nearby area. The Census Bureau does not release information about its specific methods for swapping. While this confidentiality around swapping techniques is important to protect against disclosure, it means that the practice is not transparent to data users, which prevents data users from assessing the impact of those protections on the published data.

The Census Bureau continued to use data swapping to avoid disclosure in the 2000 and 2010 decennial censuses. It also used techniques such as top- and bottom-coding, blank-and-impute algorithms, table and cell suppression, and other methods to protect responses against disclosure.[8]

Big Data, Big Potential Threats

Advances in computing technology and rapid growth in the number of commercially available databases on people and households have increased concerns about data privacy. Published tables from the Census Bureau are increasingly vulnerable to database reconstruction and re-identification attacks—that is, an outside party could, by combining information in published tables, reconstruct the original census responses without names or addresses; link these to external databases (or using personal knowledge about a person) on variables shared in common with the census responses; and, from this linking, infer confidential information about individual census respondents. When a person's census record (including block-level location and name) is correctly inferred by linking with an external dataset, we refer to this as a confirmed or correct re-identification.

Some inferences about confidential information can be achieved with purely statistical information (especially for blocks with many identical records). These inferences rely on aggregate statistical information about groups and do not rely on any individuals' confidential census responses. For example, suppose Alice is trying to learn how Bob responded to the race question, and she already knows Bob lived in Montana at the time of the 2010 Census enumeration. Alice could then review the 2010 Census tables, and because she can find that 89.4 percent of respondents reported "White Alone" in Montana, Alice can guess with high confidence that Bob's census

[7] "Disclosure Avoidance Techniques Used for the 1970 Through 2010 Decennial Censuses of Population and Housing," <www.census.gov/library/working-papers/2018/adrm/cdar2018-01.html>.

[8] Ibid.

Figure 1.1. **A History of Census Privacy Protections**

Source: U.S. Census Bureau.

response was "White Alone." This is an example of an inference based on aggregate statistical information about groups, rather than knowledge of Bob's confidential census response. The Disclosure Avoidance System (DAS) permits accurate inferences based on aggregate statistical information about groups. Bob's census response was one of 989,415 in Montana in 2010, and so, even if Bob had never participated in the census, it would still be easy for Alice to guess that Bob's race is probably "White Alone," just by reviewing the responses of the other participants and guessing that Bob's response would match the most common response.

Re-identification of an individual's confidential census responses, however, can occur when an outside party is able to leverage information from statistics in the published data to reconstruct the individual-level records that were used to generate the published tables. When combined with outside information, this approach allows an outside party to infer with high confidence what an individual's confidential census responses were. Suppose, for example, that on his 2010 Census form Bob reported being "Some Other Race Alone," that Bob was the only resident of his census block, and that Alice knows Bob's address (and subsequently his block). Alice could then easily review the published tables for Bob's block, find that a single person reported "Some Other Race Alone," and, if not for the disclosure avoidance techniques used in 2010 (swapping, especially), guess with complete confidence that Bob reported "Some Other Race Alone." This is an example of a privacy-violating inference—if Bob had not participated in the census, Alice would not be able to infer Bob's race in this way as his block would have a reported count of zero.[9] Because Alice could only learn this information about Bob as a direct result of Bob's data being present in the confidential census responses, this kind of learning is about information unique to Bob's confidential response. Both the household swapping procedures used by the Census Bureau in 2010 and the differentially private algorithms used in the 2020 DAS are intended to control how much can be learned about confidential information, while still allowing users of census data to learn about statistical information.

In the examples with Bob and Alice, Alice already had enough auxiliary or "side" information about Bob to learn about Bob directly from the published census tables, but advances in mathematics and computing now allow Alice to go a step further. She can take the published tables and infer highly accurate, complete record-level responses from them for a large proportion of the U.S. population. This process of inferring complete census records from the published tables is like filling in the missing cells in a giant Sudoku puzzle. In Sudoku, players use logic to infer missing numbers in a grid based on the numbers that are available.

Database reconstruction works in a similar way; every piece of published data makes it easier to infer the underlying records. For example, a person's age may not be published, but it may be possible to reconstruct that person's age based on other data available in the Census Bureau's statistical tables.[10]

For Alice, reconstructing complete records could be useful. Suppose that Alice knows Bob's address and that he is over the age of 18, but a second person also lives on Bob's block, so that Bob's block table had one "Some Other Race Alone" and one "White Alone" person reported in it. Alice could not be sure just from these two counts if Bob reported "Some Other Race Alone" or "White Alone." However, if Alice can reconstruct complete record-level responses and finds that the "Some Other Race Alone" person is of voting age, while the "White Alone" person is under the age of 18, then Alice can infer that Bob must correspond to the "Some Other Race Alone" response.

More generally, Alice might be an outside party armed with not just a small amount of knowledge about a single person, but a large external database. Using this database of information on many different people, Alice could then frequently re-identify individuals simply by finding another set of data that is consistent with the reconstructed records.[11] Once individual-level records have been reconstructed, re-identification of specific individuals in those data is often quite easy. In fact, re-identifications have already occurred with datasets outside of the Census Bureau. In 2006, Netflix released an anonymized list of movie ratings from nearly 500,000 users. Researchers described how they could use this database—in combination with a separate Internet Movie Database that included raters' identities—to identify a Netflix user 96 percent of the time based on just eight movie ratings and the approximate timeframe when a rating occurred.[12] The Census Bureau has recently

[9] We emphasize that the key issue here is that Alice's inference could not have been made without Bob's data being present in the census and could only be made with his data present; this is what makes the inference unique to Bob's census response. That Bob is the only resident of his block and the inference is 100 percent certain, rather than just highly confident, both help to make the example simple. Privacy-violating inference can still take place in blocks with large populations (even if it is more common in small populations) and when an attacker can be confident but not certain.

[10] John M. Abowd et al., "The Modernization of Statistical Disclosure Limitation at the U.S. Census Bureau," 2020, available at <www.census.gov/library/working-papers/2020/adrm/modernization-statistical-disclosure-limitation.html>, accessed August 11, 2021.

[11] Simson Garfinkel, John M. Abowd, Christian Martindale, "Understanding Database Reconstruction Attacks on Public Data," *Communications of the ACM*, Volume 62, Number 3, March 2019, pp. 46–53, <https://cacm.acm.org/magazines/2019/3/234925-understanding-database-reconstruction-attacks-on-public-data/fulltext>.

[12] Arvind Narayanan and Vitaly Shmatikov, "How to Break Anonymity of the Netflix Prize Dataset," 2006, <https://arxiv.org/abs/cs/0610105>.

documented re-identification attacks made on its data products by outside researchers who provided the documentation.[13]

Census data present an enticing target for re-identification attacks. As the federal government's largest statistical agency, the Census Bureau publishes a very large number of statistics. The 2010 Census data products included over 150 billion statistics based on 309 million people and 1.9 billion confidential data points. This wealth of published statistics suggests that highly accurate reconstruction of census records may be possible, and, if it is possible, that many re-identifications not attributable purely to statistical information may also be possible, especially in small blocks and subpopulations.

In 2018, the Census Bureau conducted an experiment to simulate database reconstruction based on tables published from the 2010 Census. Analysts began by reconstructing the geographic location (i.e., census block), sex, age, race, and ethnicity of all 309 million individuals in the census. On these records, location (census block) and whether the person was voting age or not were always correct. In addition, for 144 million people or 46 percent of the U.S. population, all five variables were identical to the census responses; an additional 76 million were also identical except for variation of 1 year of age.[14] Next, they linked the reconstructed records with information available through commercial databases and were able to find likely matches for 138 million individuals. From those 138 million likely matches, they were able to confirm 38 percent. Overall, they were able to correctly re-identify about 52 million people or 17 percent of the total U.S. population in 2010.

Reconstructing 100 percent of the 2010 Census records with full accuracy for 46 percent of the U.S. population is alarming. It implies that the combined effect of the released tables no longer meets the existing 2010 Census standards for microdata releases. The 2010 standards for microdata releases allowed a sample of microdata to be published only for geographic areas with at least 100,000 people and with demographic categories of at least 10,000 people nationally. However, the 144 million exactly reconstructed records respect none of these constraints. This set of 144 million records includes census blocks—all with population less than 100,000—and many demographic subpopulations with national counts much smaller than 10,000. This "implicit release" of microdata led the Census Operating Committee in January 2018 to elevate reconstruction to an enterprise-level 2020 Census risk.

A correct re-identification rate of 38 percent in the 138 million linked records is still more alarming. This involves linking names and addresses from an external database to the reconstructed records and checking that a record with that name, address, and the reconstructed demographic characteristics is present in the unprotected census data in the predicted census block. From this kind of linking, an attacker could infer confidential, sometimes sensitive information about individuals that was not already present in the external database, like race and ethnicity. However, some of these re-identifications are purely statistical, in the sense described above. The re-identification, and the inferences it enables, would have been possible by reasoning just from statistical aggregates, even if the person re-identified had never participated in the census.

When focusing on small-population blocks, a single person's participation has a much larger influence on whether they could be re-identified. In the extreme case where a person lives in a one-person block, if their data were not included in the census, the specific re-identification procedure used in the Census Bureau's simulation would never re-identify this person. In small blocks, the 38 percent rate of confirmed re-identifications jumps to 72 percent. This increase in confirmed re-identification rates in small blocks suggests millions of records exist for which the re-identifications in the simulated attack could not have been reasonably achieved purely from statistical information about their communities.

More concerning still is that the simulated attack discussed above was just a "lower bound"—a single, relatively simple, reconstruction-abetted, re-identification attack, with just a single set of external information in use. External attackers may have more resources, better external databases, and more clever algorithms. While the simulated reconstruction-abetted re-identification attack focused on inferences about race and ethnicity, future attacks could focus on other characteristics. It is difficult to predict what kinds of inferences might be harmful to the confidentiality of respondents in future censuses. The questions for the 2030 Census have not been determined, but the 2020 Census included data on children, same-sex relationships, household composition, older adults, and parents who are a different race or ethnicity than their children. Controlling the rate of inference an attacker may try to make about individuals is exactly the problem that the 2020 Census DAS was designed to address.

[13] Laura McKenna, "U.S. Census Bureau Reidentification Studies," U.S. Census Bureau, Washington, DC, 2019, <https://www2.census.gov/adrm/CED/Papers/CY19/2019-04-Reidentification%20studies-20210331FinRed.pdf>, accessed August 11, 2021.

[14] Declaration of John Abowd, U.S. Census Bureau, State of Alabama v. U.S. Department of Commerce, Appendix B, United States District Court for the Middle District of Alabama Eastern Division, filed April 13, 2021.

Methods like data swapping that were used in the 2010 Census were designed to protect data for individuals who were considered most likely to be re-identified. But new computing technologies, by enabling large-scale, complete-record-level reconstructions, have drastically expanded the number of people who are vulnerable to re-identification. Older disclosure avoidance methods were not designed to defend against potential database reconstruction and re-identification attacks. If traditional disclosure avoidance techniques were applied to the 2020 Census data, the amount of noise required to protect against new attacks would make census data unfit for most uses. This vulnerability prompted the Census Bureau's Data Stewardship Executive Policy Committee (DSEP) to modernize disclosure avoidance for the 2020 Census.

Differential Privacy Enters the Scene

For the 2020 Census data, the Census Bureau applied a relatively newer disclosure avoidance framework based on "differential privacy." What is differential privacy and how does it differ from previous disclosure avoidance frameworks? The "goal of differential privacy is to obscure the presence or absence of any individual (in a database), or small groups of individuals, while at the same time preserving statistical utility."[15] The basic idea behind differential privacy is that the level of disclosure risk can be quantified, even when we cannot know what kinds of algorithms or external databases an attacker might deploy, which is important for transparency in setting disclosure review standards.[16]

Differential privacy works by adding "noise" to the collected data. Imagine the image on a television screen: what appears to be a clear, crisp picture is actually composed of millions of pixels, tiny dots of color. If you were to zoom in, you could identify individual pixels. Adding noise to the census data is like introducing small changes to the pixels. The noise reduces the risk that you can correctly identify any one individual but retains the overall picture when you zoom back out (Figure 1.2).

Adding noise into the data is a tradeoff. Adding more noise increases confidentiality protection, but it also makes the data less accurate. With differential privacy, we can now quantify that tradeoff (Figure 1.3).

Differential privacy is a framework in which the outcome of any data analysis—from a simple tabulation to a complex regression—is nearly equally likely, whether any individual is, or is not, included in the dataset. Because of this statistical property of the framework, differential privacy allows the Census Bureau to limit the disclosure risk for published data. If the output of an analysis is essentially the same, regardless of whether a given individual is in the dataset, then that person's confidential information is protected. There are numerous ways to implement differential privacy. This means that differential privacy is a characteristic of an algorithm or process, not a specific algorithm.

Differential privacy has some clear advantages over prior Census Bureau approaches to disclosure avoidance:

- Differential privacy allows the Census Bureau to track and address potential privacy loss as the list of published tables is expanded.
- Unlike prior methods of table suppression or record swapping, differentially private data can be published, analyzed, and linked to other data without any increased risk of disclosure; once the data have been processed, there is no more privacy loss regardless of how the data are used.
- Differential privacy provides mathematically provable guarantees against a wide range of potential privacy attacks.
- Differential privacy is transparent, unlike prior data protection methods such as data swapping. The programming code and decisions for differential privacy are available to the public; the only information not published is the exact value of the noise that is added to a given data point.[17]

[15] C. Dwork, "Differential Privacy: A Cryptographic Approach to Private Data Analysis," in Privacy, Big Data, and the Public Good, Cambridge University Press, New York, NY, 2014, pp. 296–322.

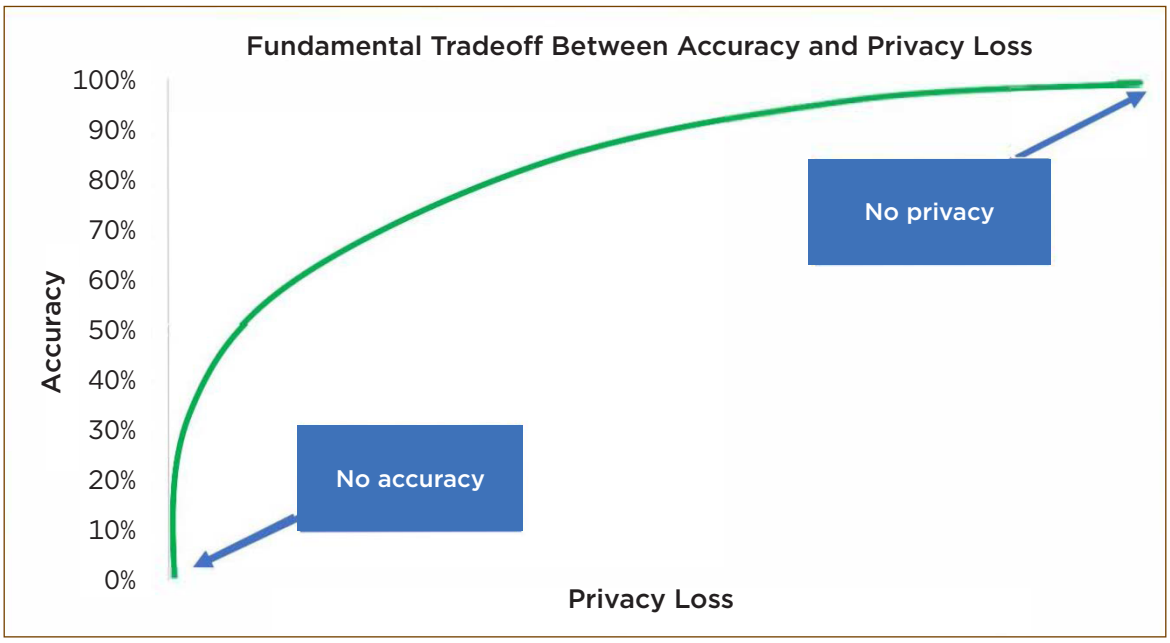
[16] C. Dwork, "Differential Privacy: A Survey of Results," Theory and Applications of Models of Computation, Lecture Notes in Computer Science, Springer, Berlin, Heidelberg, 2008, Vol. 4978, <https://doi.org/10.1007/978-3-540-79228-4_1>.

[17] The code base can be found at <https://github.com/uscensusbureau>.

Figure 1.2. **Adding Noise to Population Data Is Like Blurring Faces in a Photo**

Source: Population Reference Bureau.

Figure 1.3. **The Accuracy/Privacy Loss Tradeoff**



Source: U.S. Census Bureau.

Publishing the code base is an important step toward transparency because it allows data users to assess the impact of disclosure avoidance on the data, which was not possible with traditional disclosure avoidance methods like swapping. Documenting the impact of this noise infusion allows data users to assess whether the published data are suitable for their specific applications. We call this assuring the data's "fitness for use."

Differential privacy has been in use for Census Bureau products for more than a decade. In 2008, the Census Bureau published the world's first differentially private dataset through the Longitudinal Employer-Household Dynamics OnTheMap application—a revolutionary data system that links federal, state, and Census Bureau data on employers and employees.[18] Differential privacy is also used for other datasets, such as the Post-Secondary Employment Outcomes tabulations[19] and the Opportunity Atlas.[20] These data—which serve as an important resource for local planning, decision-making, and research—would not be available without modern disclosure avoidance methods such as differential privacy.

Differential privacy forms the foundation of the DAS used to protect the confidentiality of the 2020 Census data.

[18] More information on "OnTheMap" is available at <https://onthemap.ces.census.gov>.

[19] More information on "Post-Secondary Employment Outcomes (PSEO)" is available at <https://lehd.ces.census.gov/data/pseo_experimental.html>.

[20] More information on "The Opportunity Atlas" is available at <www.opportunityatlas.org/>.

2. HOW DOES THE DISCLOSURE AVOIDANCE SYSTEM WORK FOR REDISTRICTING DATA?

This handbook describes the Disclosure Avoidance System (DAS) in the context of the 2020 Census redistricting data because those are the first 2020 Census data that are protected using differential privacy. (The apportionment counts released earlier, in April 2021, were not subject to these new disclosure avoidance procedures and were instead the actual enumerated population counts for each state.)

As of the publication of this handbook (November 2021), the U.S. Census Bureau is still determining how to optimize the DAS for the next scheduled 2020 Census data products—the Demographic Profile and the Demographic and Housing Characteristics File. Information about confidentiality protection methods for these later data products will be published when more information is available.

Public Law 94-171, enacted by Congress in December 1975, requires the Census Bureau to provide states with census data they may use for legislative redistricting. The redistricting data files contain housing unit counts by occupancy status, total population, and population counts by race/ethnicity and voting age (aged 18 and over). For the first time, the 2020 redistricting data files also include data on the population living in seven major group quarters types, such as correctional facilities, college/university student housing, or military quarters.

The Census Bureau's DAS for redistricting data has two parts: differential privacy algorithms and post-processing. Both take place within a framework known as the TopDown Algorithm (TDA). The differentially private algorithms add noise to the data, while post-processing imposes certain consistencies (for example, ensuring that the population totals for counties within a state sum to the state's total population). Steps in the TDA process are described in more detail below.

How Noise Is Added to the Data

How does the Census Bureau apply differential privacy algorithms to the 2020 Census data? Working with input from stakeholders, the Census Bureau first compiled a list of tables for the 2020 Census redistricting data files.[21]

[21] A detailed list of tables is available in the Census Bureau's "2020 Census State Redistricting Data (Public Law 94-171) Summary File Technical Documentation," <https://www2.census.gov/programs-surveys/decennial/2020/technical-documentation/complete-tech-docs/summary-file/2020Census_PL94_171Redistricting_StatesTechDoc_English.pdf>.

Next, the Census Bureau consolidated all the redistricting data tables into one detailed cross-tabulation that reflects all the variables for each geographic level (from the nation, to states, down to census blocks), all categories for each variable in the dataset, and combinations of those categories (Table 2.1). For example, there are two categories for ethnicity—Hispanic or Latino and Not Hispanic or Latino.

In the published redistricting data files, there are 252 possible combinations of race, ethnicity, and age (63 x 2 x 2 = 252), plus eight residency types for people (housing unit plus seven group quarters types) and two occupancy status categories for housing units, which constitute 262 (252 + 8 + 2) distinct published data elements for each geographic unit.

To generate these published data, the TDA uses an even more detailed cross-tabulation that crosses the 252 race, ethnicity, and age categories with eight residential categories (lives in a housing unit and seven group quarters types) to get 2,016 (252 x 8) distinct data elements per geographic unit.

There are approximately 8 million census blocks in the 2020 Census—the smallest geography at which redistricting data are available. With 2,016 data elements per block, this means that there are more than 16 billion data cells for people in TDA. There are more than 12 million cells for housing units in that part of TDA.

Providing highly accurate information for every data cell would pose a disclosure risk; so, noise is added to protect the confidentiality of individual respondents. Adding noise to the data means that for any given data point, the TDA may add or subtract a small amount from the count to obscure the original value.

Table 2.1. **Number of Categories in the 2020 Census Redistricting File**

Variable	Number of categories
Race (6 race alone groups; 57 multiple race combinations)	63
Ethnicity (Hispanic or Latino; Not Hispanic or Latino)	2
Age (voting age, total population)	2
Occupancy status (occupied, vacant)	2
Population in group quarters (7 types)	7

Note: This table shows the number of categories for each variable, not the publication data layouts.
Source: Population Reference Bureau.

The level of noise introduced is guided by a "privacy-loss budget"—the budget defines the absolute upper bound of privacy loss that can occur. The privacy-loss budget can be set higher or lower, acting like a dial that tunes the amount of noise that is added to the data. As the privacy-loss budget rises, noise decreases (a greater share of the random noise numbers drawn are at or close to zero), meaning the data will be more accurate, but the likelihood that the reconstructed data can be used for re-identification also rises.

This privacy-loss budget can be set anywhere on a spectrum from "no accuracy but high protection" to "high accuracy but no protection." Choosing the privacy-loss budget is a policy decision based on a desired balance between accuracy and confidentiality, and the decision must be simultaneously informed by the Census Bureau's legal obligations and feedback on data utility from stakeholders. The lower the budget, the higher the protection and the less precise is each data point.

The total privacy-loss budget must be allocated across population characteristics, housing characteristics, and geographic levels. This process happens for selected topics referred to as "queries," rather than for the whole tabulation at once. More on this process is available in the "Multipass Optimization" section.

Technical Appendix A provides more information about the overall privacy-loss budget for redistricting data and how the budget is allocated across characteristics and geographic levels.

Privacy-Loss Budget Allocation

The overall privacy-loss budget must be distributed across all published census products (tables and microdata). Spending some of the budget to improve accuracy for one dimension of the data (such as more accurate total population counts for blocks) may mean that there is less budget for accuracy in another dimension (such as race detail). A detailed description of the privacy-loss budget for the 2020 Census and a listing of the budget for each table type and geographic hierarchy level is available in Technical Appendix A.

An illustrative example of noise infusion is shown in Table 2.2. In this example, noise is added to a tabulation of data by voting age and nonvoting age for the five census blocks in a hypothetical census block group. In the first step, noise is added independently to each of the individual tabulations.[22] In a second step, the noisy data are then controlled to the block group's tabulations and most inconsistencies are fixed. More information on the types of adjustments made in this second step is available in the "Additional Constraints" and "Example of Post-Processing" sections.

Within the TDA, the noise added to any given cell in a table is randomly drawn from a statistical distribution (described in more detail in Technical Appendix A).

The amount of noise added to any cell is independent of the size of the population in the cell. For example, it is equally likely that five people could be added to an area with a population of 100,000 or 100. This means that while the *absolute* error is the same for both areas, the noise added to small population cells will result in higher *relative* error because the underlying population (the denominator) is smaller. This higher relative error for small populations is an advantageous feature inherent to most disclosure avoidance methods including swapping, as re-identification risk is typically highest for data about small populations.

Notice in Table 2.2 that the amount of noise added to each cell is independent of the size of the cell—meaning a small cell may include a larger amount of noise or vice versa. Some cells may have zero noise added, meaning their values remain unchanged.

Noise is also added independently for each characteristic in each cell such as total population and population by voting age. The independence of the noise across cells in the same table may, however, lead to logically inconsistent data, such as the population aged 18 and over being larger than the total population in the hypothetical example for block 5.

[22] Noise is not added to state total populations nor to the national total but is introduced at lower geographic levels.

Table 2.2. **Hypothetical Example of Noise Infusion for a Census Block Group**

Step 1: Adding Noise to Tabulations

Block	Enumerated counts			Noise			Preliminary noisy table		
	Population under age 18	Population aged 18 and over	Total population	Population under age 18	Population aged 18 and over	Total population	Population under age 18	Population aged 18 and over	Total population
Block 1	25	75	100	0	−4	2	25	71	102
Block 2	20	70	90	−3	2	3	17	72	93
Block 3	10	40	50	2	−3	−2	12	37	48
Block 4	1	9	10	−2	1	1	−1	10	11
Block 5	1	2	3	0	2	0	1	4	3

Source: U.S. Census Bureau.

Noise may be positive or negative. For small cells, negative numbers make it possible that the noise-infused counts will be negative. Adding –2 to a population of 1 would result in a noise-infused value of –1 (as shown in the hypothetical example for the nonvoting-age population of block 4). Negative results are evidence of the uncertainty caused by the disclosure avoidance but are often confusing to data users, so a post-processing step is needed to adjust the noisy results and eliminate negative numbers.

Post-Processing the Noisy Statistics to Produce Tables

Invariants

The DAS departs from "textbook" differential privacy in one important way. The redistricting data include certain invariants—data that are kept exactly as enumerated with no noise added. Unlike traditional approaches to disclosure avoidance, differentially private noise infusion offers quantifiable and provable confidentiality guarantees. These guarantees, reflected in the global privacy-loss budget and its allocation to each statistic, serve as a promise to data subjects that there is an inviolable upper bound to the risk that an attacker can learn or infer something about those data subjects through publicly released data products. While that upper bound is ultimately a policy decision, and may be low or high depending on the balancing of the countervailing obligations to produce accurate data and to protect respondent confidentiality, the level of the global privacy-loss budget is central to the ability of the approach to protect the data. Invariants are, by their very nature, the equivalent of assigning infinite privacy-loss budget to particular statistics, which compromises the central promise of differentially private solutions to controlling disclosure risk. By excluding the accuracy of invariant data elements from the control of the privacy-loss budget, invariants exclude the disclosure risk and potential inferences that can be drawn from those data elements from the formal privacy guarantees. Thus, instead of being able to promise data subjects that the publication of data products will limit an attacker to being able to infer, at most, a certain amount about them (with that amount being determined by the size of the privacy-loss budget and its allocation to each characteristic), the inclusion of one or more invariants fundamentally excludes attacker inferences about the invariant characteristic(s) from the very nature of that promise. The qualifications and exclusions to the privacy guarantee weaken the strength of the approach and make communicating the resulting level of protection substantially more difficult. For these reasons, the Census Bureau chose to limit the number of invariants for the 2020 Census.

State population counts from the census are used to reapportion seats in the U.S. House of Representatives across the 50 states. The Census Bureau held the total population for each state invariant. Other statistics are held invariant for operational purposes, such as the total number of housing units in each census block and the number and type of group quarters facilities in each census block.

Invariant statistics for the 2020 Census redistricting data are:

- Total number of people in each state, the District of Columbia, and Puerto Rico.
- Total number of housing units (but not population counts) in each census block.
- Number of occupied group quarters facilities (but not population counts) in each census block by the following types:
  - Correctional facilities for adults.
  - Juvenile facilities.
  - Nursing facilities/skilled-nursing facilities.
  - Other institutional facilities.
  - College/university student housing.
  - Military quarters.
  - Other noninstitutional facilities.

All other population and housing characteristics, including population counts for every geography below the state level, have had noise introduced.

Additional Constraints

In addition to the invariants noted above, there are some constraints within TDA that are applied at all geographic levels. These constraints include the following:

- Population and housing counts must be integers and may not be negative.
- The cells of a table must sum to its row and column margins, which must in turn sum to the total population for the table.
- Counts must be consistent within tables, across tables, and across geographies for a given universe (i.e., population tables are consistent with population tables, and housing tables are consistent with housing tables). For example, the population by race must sum to the total population, the number of occupied and vacant housing units must sum to the total number of housing units, and the population in each county within a state must sum to the state's total population.
- If there are zero housing units and zero group quarters (GQ) facilities in a geography, then no people may be assigned to that geography.
- The number of people per GQ facility is greater than or equal to 1.

- The number of people per housing unit is less than or equal to 99,999, and the number of people per GQ facility is less than or equal to 99,999.
- There are zero people aged less than 18 in GQ type 301, "Nursing facilities/skilled nursing facilities."

While these constraints have been applied in TDA, some inconsistencies may remain in the redistricting data files. These inconsistencies are described in detail in the section "Improbable and Impossible Results."

How Does the TopDown Algorithm (TDA) Work?

1. After the confidential Census Edited File (CEF)[23] is input into the DAS, the system's TDA takes an extensive series of differentially private "noisy" measurements.
2. The algorithm uses these measurements to generate privacy-protected microdata records for the entire nation.
3. These individual records contain every level of geography on the Census Bureau's geographic hierarchy based on the noisy measurements taken at each of those geographic levels and subject to the population invariants and other constraints.
4. These microdata records are exported into the tabulation system to generate the redistricting data products.
5. The resulting data reflect the privacy guarantees established by the privacy-loss budget for the 2020 Census, incorporating the greatest level of uncertainty at the census block level (where privacy risk is usually greatest), while providing increasingly accurate measures of the nation's population at each higher level of geography.

[23] The 2020 CEF—the individual census responses that have been processed through quality control routines such as filling in missing information.

Moving From the Top to the Bottom of the Geographic Hierarchy

The Census Bureau also considers geographic nesting, such as counties within states, as it applies noise at different geographic levels.

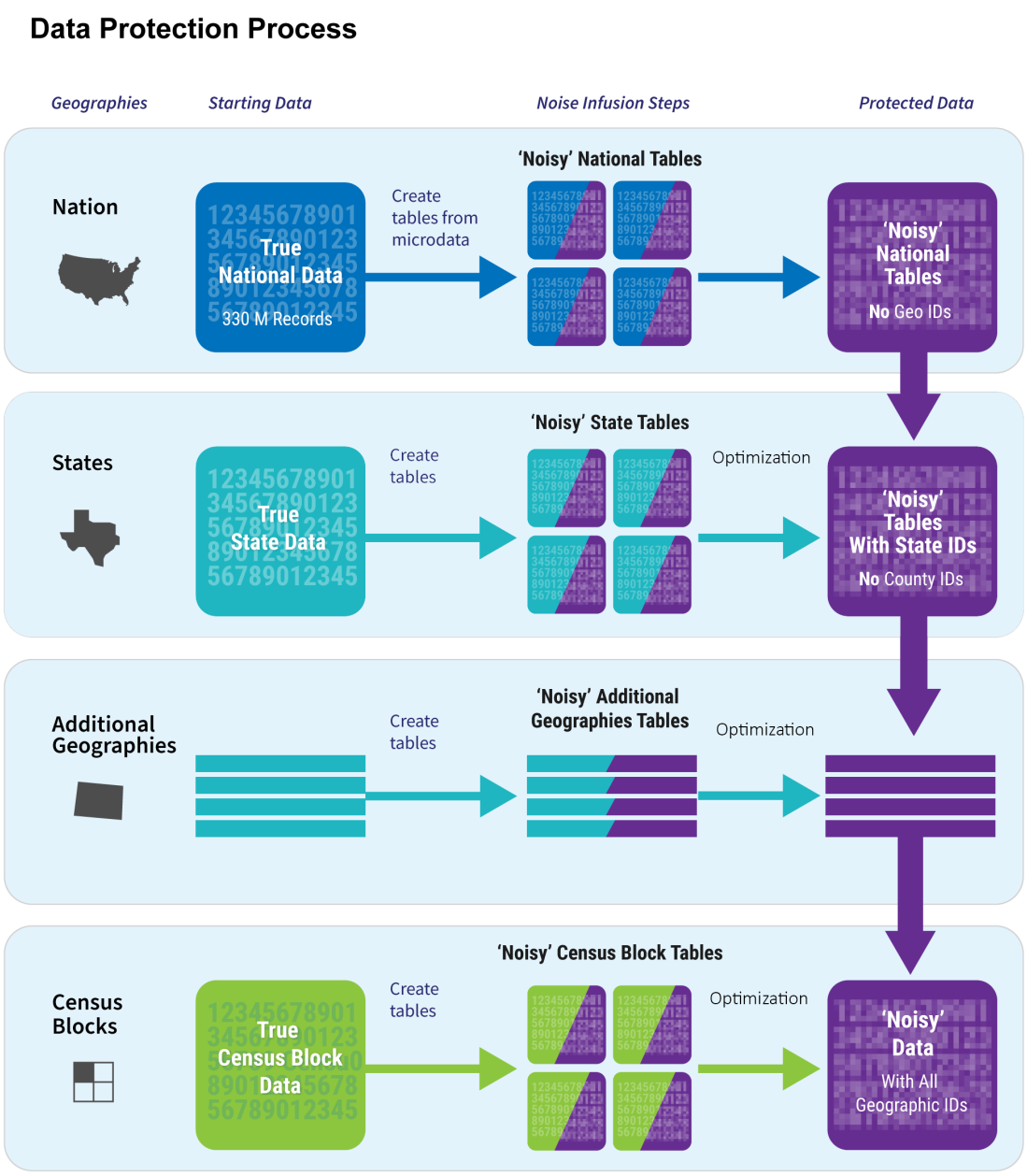
Starting with the list of redistricting tabulations described above, the Census Bureau queries the 2020 CEF to produce certain tabulations, such as counts of the voting-age population, for every geographic area in the country. The TDA adds noise to cells in those tabulations using a differential privacy mechanism. Then starting at the national level, the noise-infused tabulations are used to adjust a detailed cross-tabulation—representing all of the combinations of characteristics across all of the data—to create a new nationwide, noise-infused set of data. These data include a "noisy" record representing every person in the United States but do not yet include geographic information. (Figure 2.1)

Once the national data are set, the process is repeated for states. In the state step, mathematical optimization routines ensure that the state totals for different population or housing characteristics are as close as possible to the noisy measurements and that these state totals, when added together, are consistent with the national data from the prior step. The result is an updated set of data that now includes state identifiers.

This optimization process is repeated for a series of ever-smaller geographic units, ending with census blocks. The geographic hierarchy is described in more detail in the section on "Geographies and the Geographic 'Spine.'"

In the very last step, the tabular census block data are converted back into microdata.

Figure 2.1. **Creating Differentially Private Data for the 2020 Census Redistricting Files**



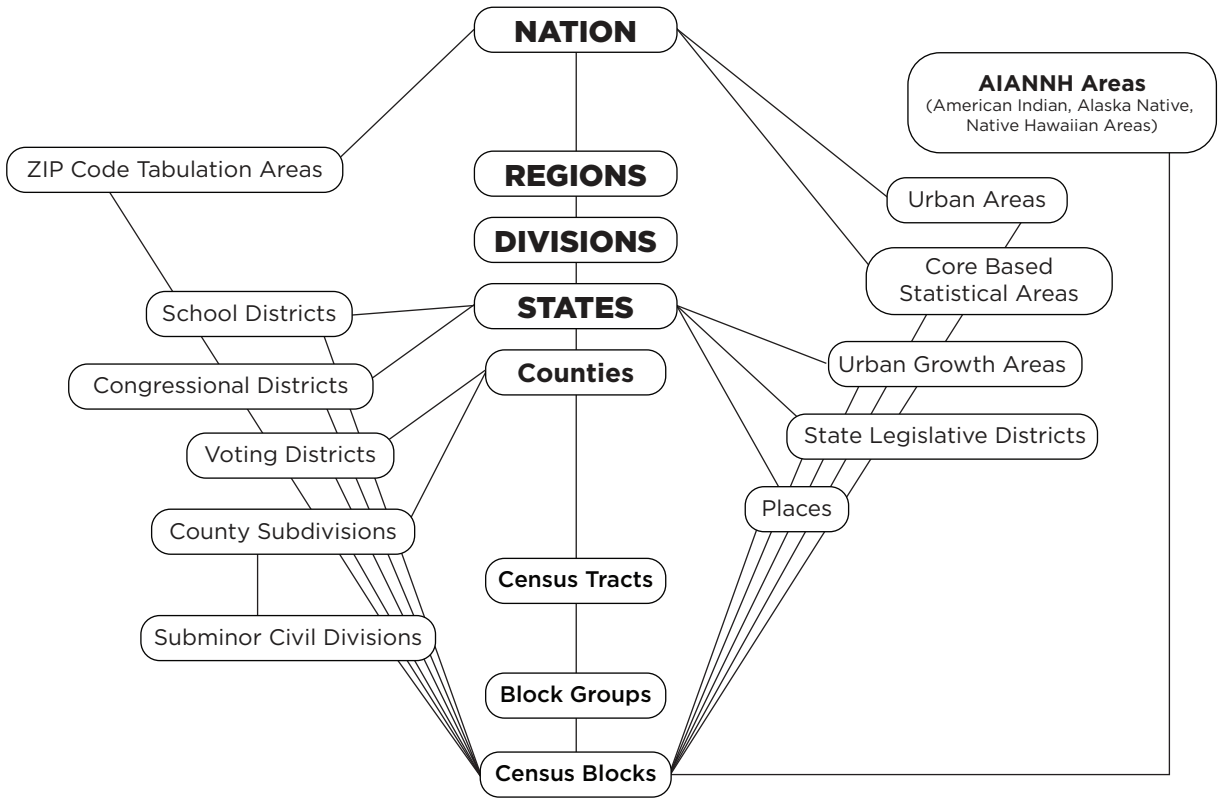
Source: Population Reference Bureau.

Geographies and the Geographic "Spine"

The hierarchy, or nesting scheme, of geographies for census data products is sometimes called the geographic "spine" (Figure 2.2). Along the spine, each "child" geography perfectly nests within its "parent" geography. For example, all counties nest within one (and only one) state. Starting with the smallest unit along the geographic spine and working upward: blocks nest within block groups, block groups within census tracts, census tracts within counties, counties within states, states within divisions, divisions within regions, and regions within the nation.

Some geographies, however, do not fit within the nesting scheme. School districts, for example, can be summed up from blocks and fit within states but do not necessarily follow block group or tract boundaries. Because these nonnested, or "off-spine," geographies are not part of the TDA processing routine, the noise-infused data for these areas may be noisier than those for the on-spine geographies. To address feedback from data users about the importance of accurate data for off-spine geographies, the Census Bureau made changes to the geographic hierarchy used for TDA.

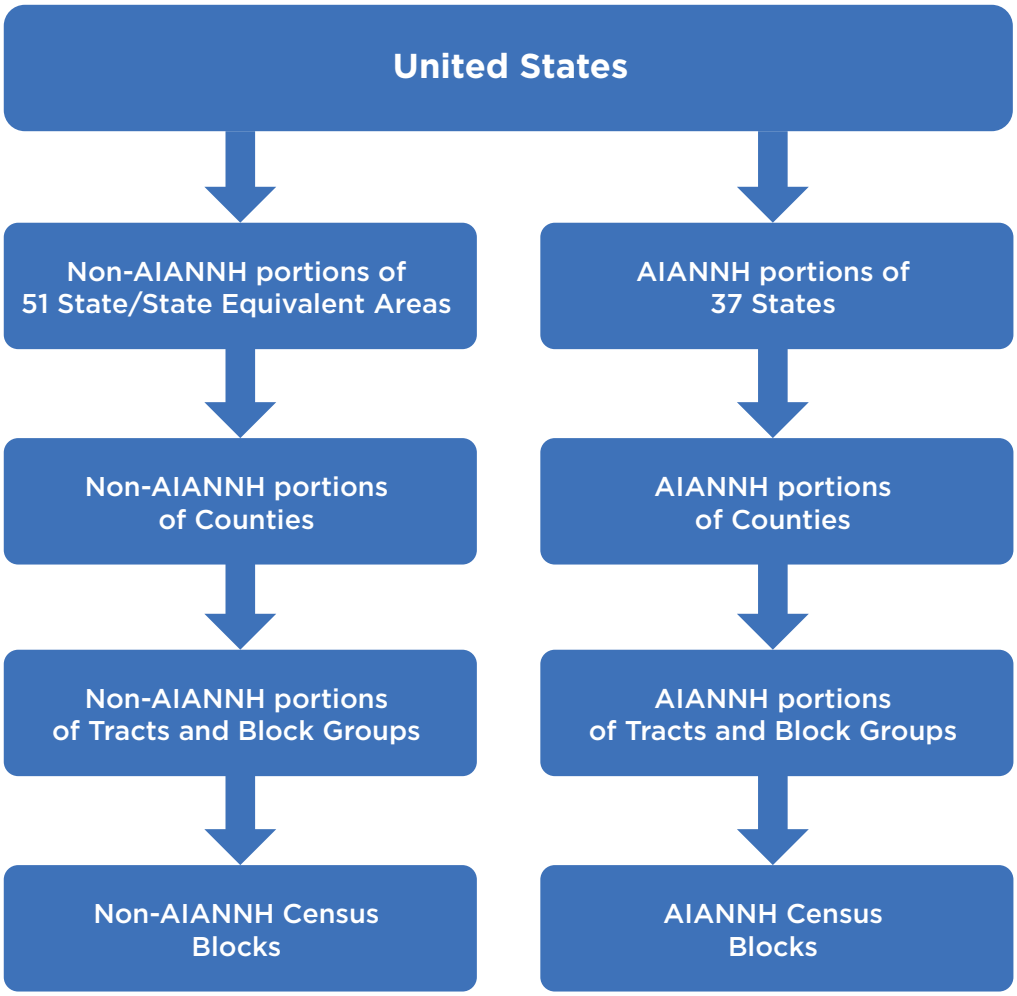
Figure 2.2. **Standard Hierarchy of Select Geographic Areas**



Source: U.S. Census Bureau.

The hierarchy used for TDA differs from the standard hierarchy of census geography in important ways. First, for states with American Indian/Alaska Native/ Native Hawaiian (AIANNH) areas, the AIANNH and non-AIANNH portions of the state are split to improve data accuracy for AIANNH areas (Figure 2.3).

Figure 2.3. **Hierarchy for Disclosure Avoidance System Processing**



Source: U.S. Census Bureau.

Within TDA, all AIANNH areas in a state are grouped together for data processing. This minimizes the likelihood that post-processing could result in systematic undercounts. For example, at the state level, three American Indian areas in Kansas—the (IA-KS-NE) Reservation and Off-Reservation Trust, Kickapoo (KS) Reservation, and Prairie Band of Potawatomi Nation Reservation—are processed together, separate from the rest of Kansas (Figure 2.4). At lower geographic levels, these individual tribal areas are then processed separately from each other.

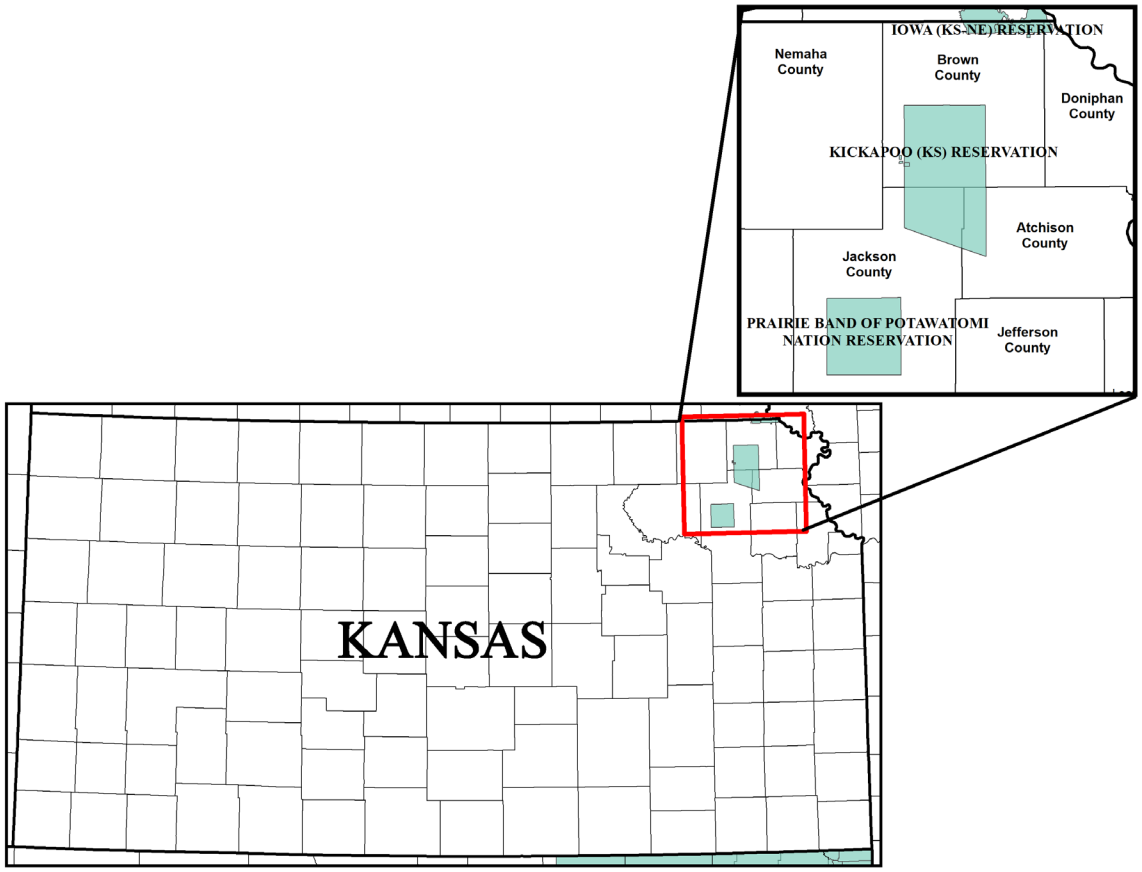
Another important departure from the standard geographic hierarchy is in how blocks are grouped before being aggregated to tracts. Rather than using the Census Bureau's standard block groups, blocks are aggregated—sometimes in groups of nonbordering blocks—to improve the TDA's processing efficiency and reduce post-processing error especially for GQ residents.

In most states, the District of Columbia, and Puerto Rico, these block aggregations (called "optimized block groups" in the technical documentation) were redefined to more closely approximate places (such as cities). In 12 states, blocks were aggregated to more closely approximate minor civil divisions (cities, boroughs, and towns/townships).

While some of the TDA geographic groupings differ from those in the standard geographic hierarchy, data products will still be released for the standard tabulation geographic entities. TDA geographies are intended for data processing, not for reporting.

In TDA, the Census Bureau processes all of the geographic units within a larger geographic area at the same time to ensure that they add up to the parent geography. For example, the Census Bureau examines the noisy population counts for all tracts within a county, and then finds the set of counts for each tract

Figure 2.4. **Example of Grouping American Indian, Alaska Native, and Native Hawaiian Areas for TopDown Algorithm in Kansas**



Source: U.S. Census Bureau.

that is closest to its noisy count but that also adds up to the total population for the county.

Example of Post-Processing

After the DAS produces noise-infused counts, the data undergo further post-processing. More information about constraints integrated into the post-processing step is available in the "Additional Constraints" section.

Table 2.3 builds on Table 2.2, adding the post-processing step to the example of noise-infused data. The noise introduced into each table cell results in population totals that are different from the original data. The processing steps handles several issues from the noisy data step. First, negative population counts, such as the –1 value for the Block 4 population aged 18 and over are adjusted to be nonnegative. Some inconsistencies, such as population aged 18 and over being larger than total population (as occurs for the Block 5 population), are also resolved. Then, the noisy characteristics are adjusted to match the total noisy population across all relevant geographies. In this example, the preliminary noisy block population totals summed to 257, but must be adjusted to sum to 254, the privacy-protected block group total.

Multipass Optimization

While the noisy measurements themselves do not introduce bias into the results because noise is drawn from a symmetrical distribution centered on zero (with an equal distribution of positive and negative noise values), the post-processing step may introduce bias, by e.g., removing negative values or to impose other constraints on the resulting data. More information about this can be viewed in "Additional Constraints."

The Census Bureau implemented a new post-processing routine, called "multipass optimization," to reduce bias. Multipass optimization is described in more detail in the next section, but the routine is intended to reduce bias for small geographic areas and population subgroups.

In prior iterations of the TDA, the Census Bureau observed that small populations tended to have a positive bias, where the published count was higher than in the original, confidential data; larger populations tended to have a corresponding negative bias. For example, there was a slight bias for total population toward rural areas. The Census Bureau reconfigured the TDA parameters to largely eliminate this impact.[24]

Detailed Summary Metrics published with each of the model runs provide specific information about bias at varying levels of geography.[25]

A key feature of the final version of the TDA used to produce the redistricting data is that the accuracy and reliability of statistics should increase as the underlying population being measured increases. To address this objective, the Census Bureau implemented a multipass framework that processes certain elements of the data first and then uses those results as input to subsequent steps.

At the national level, the state level, and then for lower levels of geography, multipass first determines the population count for each unit within that geographic level (for example, the population for each county

[24] The Detailed Summary Metrics (2021-06-08) can be found at <https://www2.census.gov/programs-surveys/decennial/2020/program-management/data-product-planning/2010-demonstration-data-products/ppmf20210608/2021-06-08-data-metrics-tables_production-settings.xlsx>.

[25] More information on "Developing the DAS: Demonstration Data and Progress Metrics" is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-development.html>.

Table 2.3. **Hypothetical Example of Post-Processing**

Step 2: Post-processing

Block	Enumerated counts			Noise			Preliminary noisy counts			Post-processed counts		
	Population under age 18	Population aged 18 and over	Total population	Population under age 18	Population aged 18 and over	Total population	Population under age 18	Population aged 18 and over	Total population	Population under age 18	Population aged 18 and over	Total population
Block 1	25	75	100	0	–4	2	25	71	102	27 (+2)	71 (–4)	98 (–2)
Block 2	20	70	90	–3	2	3	17	72	93	19 (–1)	72 (+2)	91 (+1)
Block 3	10	40	50	2	–3	–2	12	37	48	12 (+2)	37 (–3)	49 (–1)
Block 4	1	9	10	–2	1	1	–1	10	11	0 (–1)	11 (+2)	11 (+1)
Block 5	1	2	3	0	2	0	1	4	3	1 (+0)	4 (+2)	5 (+2)
									Block group	**59**	**195**	**254**

Source: U.S. Census Bureau.

within a state or each census tract within a county). Next, the algorithm generates the remaining statistics, constraining those statistics to the population counts determined in the first pass.[26]

Improbable and Impossible Results

It is possible that noise infusion could result in some improbable results in the redistricting data. For example:

- A block might have only one occupied housing unit but dozens of people (implying that those dozens of people live in the same household).
- A block may have resident children under the age of 18, but no adults present.

The data could also include mathematically impossible statistics. For example:

- A block may have people living in households in an area with only vacant housing units.
- A block may have more occupied housing units than people to occupy those units.

These inconsistent and improbable results are often associated with geographic units having very small populations. For example, as shown in Table 2.4, 4.8 percent of blocks with people living in households have zero occupied housing units. But only about 0.1 percent of block groups and tracts have this kind of inconsistency.

Data users will find that the frequency of improbable and impossible results diminishes, and the accuracy of the estimates increases, as data are aggregated to larger geographic areas. For many use cases, such as detailed housing or household population analysis, block-level data may be too noisy. Block groups, census tracts, or other larger geographies may be better choices as units of analysis. Data users are encouraged to combine block-level data into geographic areas with larger populations. Doing so reduces the noise due to disclosure avoidance.

The next section provides more guidance on how users can deal with impossible and improbable results.

[26] John M. Abowd and Victoria A. Velkoff, "Modernizing Disclosure Avoidance: A Multipass Solution to Post-Processing Error," U.S. Census Bureau, Washington, DC, 2020, <www.census.gov/newsroom/blogs/research-matters/2020/06/modernizing_disclosu.html>.

Table 2.4. **Inconsistent or Implausible Results by Geographic Summary Level**

Inconsistency	Blocks affected		Block groups affected		Tracts affected		Counties affected	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Zero occupied housing units but more than zero household population	392,921	4.80	223	0.09	90	0.11	0	0.00
Zero household population but more than zero occupied housing units	91,415	1.10	30	0.01	17	0.02	0	0.00
Everyone in area under age 18 (excludes areas with group quarters population)[1]	101,127	1.80	27	0.02	17	0.05	0	0.00

[1] Share of areas that have no group quarters population.
Source: U.S. Census Bureau.

3. RECOMMENDATIONS AND CONSIDERATIONS WHEN USING THE REDISTRICTING DATA

What do data users need to know before they start using statistics from the 2020 Census redistricting data files? This section provides some considerations and recommendations for working with the data.

Block-level data should be aggregated before use. The amount of noise added to statistics does not depend on population or geographic size, so block-level data are most affected by disclosure avoidance procedures. For example, it is equally likely that five people could be added to an area with a population of 10,000 or a population of 100. As data are aggregated across blocks or across demographic groups, the accuracy of the resulting data will increase.

U.S. Census Bureau researchers found that for block groups, a minimum total population between 450 and 499 is sufficient to provide reliable characteristics of various demographic groups, whereas a minimum total population between 200 and 249 provides reliable characteristics for places and minor civil divisions.[27]

Counts are consistent within tables, across tables, and across geographies. For example, rows within a table sum up to the parent row and universe. The total population count in Table P1 is consistent with the total population count in Table P2. In addition, block-level tables sum to their corresponding block-group-level tables, block-group-level tables sum up to their tract-level tables, and so forth.

Data should not be divided across tables in low population areas. For example, values from Table P2 should not be divided by values from Table H1 at low levels of geography or for low population areas to obtain the average number of people per household. The separation of the people universe from the housing universe introduces some inconsistencies, particularly at low levels of geography (tract and smaller) such as more households than people. More on this topic is available in the "Improbable and Impossible Results" section. Users who want more accurate statistics on people per household should wait for the release of the Detailed Demographic and Housing Characteristics (Detailed DHC) File.

Data may be subtracted across tables to obtain new counts. For example, you can subtract Table P3 from Table P1 or Table P4 from Table P2 to obtain the population under 18 years old. However, subtracting data across tables at the block level may yield improbable results such as a large number of children under 18 years old relative to the number of adults. Aggregating to larger geographies reduces the likelihood of these improbable results.

The Disclosure Avoidance System is not the only source of uncertainty in 2020 Census data. Noise introduced by disclosure avoidance may compound underlying errors or may offset those errors. (Examples of these types of errors are available in the 2010 Census Post-Enumeration Survey.)[28]

[27] Tommy Wright and Kyle Irimata, "Empirical Study of Two Aspects of The TopDown Algorithm Output for Redistricting: Reliability & Variability (August 5, 2021 Update)," Working paper #2021-02, U.S. Census Bureau, Washington, DC, 2021, <www.census.gov/library/working-papers/2021/adrm/SSS2021-02.html>.

[28] More information is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/data-quality.html#metrics>.

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4. EVALUATING THE 2020 CENSUS DATA

The formal privacy methods of the 2020 Disclosure Avoidance System (DAS) will allow data users, for the first time, to understand the extent to which a statistic or data cell may have been altered and whether it is suitable for their inferences. While the actual noise in an individual data cell will not be published, the amount of expected noise can be inferred from published model parameters, the privacy-loss budget, and summary "fitness-for-use" metrics.

There have been numerous assessments of the impact of the DAS on 2010 Census data, including with using the 2020 production parameters on that 2010 data. The production parameters and privacy-loss budget allocations used for the 2020 Census redistricting data are included in Technical Appendix A.

In October 2019, the U.S. Census Bureau released an initial set of demonstration data products using 2010 Census data that had been run through an interim version of the DAS. The purpose was to demonstrate that the noise-infused data were fit for use.[29] Although the DAS did very well at ensuring the data's fitness-for-use for some important use cases, it fell short in others.

The Census Bureau released three additional demonstration data products using the same privacy-loss budget as the initial set of demonstration data products. The privacy-loss budget was held roughly the same across those four releases to allow analysts and data users to compare the effects of incremental algorithmic improvements in the system. The fifth demonstration dataset included two versions: a version using an increased privacy-loss budget and a version using the earlier, development-focused privacy-loss budget. The version using higher allocation of privacy-loss budget allowed data users to evaluate demonstration data that more readily approximated the anticipated confidentiality/accuracy tradeoff of the 2020 Census data products.

Through this process, the Census Bureau received invaluable feedback from external stakeholders through the 2020 DAS e-mail, advisory meetings, tribal consultations, and comments provided during presentations at conferences and the Differential Privacy Webinar Series that informed our efforts and decision-making. The Census Bureau and external data users identified several issues with the DAS that needed to be resolved before it could be applied to the 2020 Census data, including:

- Situations where small populations tended to gain population, whereas larger populations tended to lose population.
- Limitations of the noise-infused data for emergency planning operations.
- Issues for populations living on American Indian reservations.
- Problems with the accuracy of census data for "off-spine" geographies.[30]
- Identification of extreme outliers.
- Distortions in the data that effectively moved individuals from high- to low-density populations (e.g., from cities to rural areas or from larger race groups to smaller race groups).

The Census Bureau used these assessments to make improvements to the DAS and to make targeted increases and reallocations of the privacy-loss budget in order to improve overall accuracy for geographic areas and other characteristics, but never to favor a particular subpopulation over another. As a result of this work, the Census Bureau was able to greatly reduce or eliminate all of these limitations. Details of all demonstration datasets, including "fitness-for-use" metrics for each model run, can be found on the Census Bureau's Web site.[31] Internally, the Census Bureau also conducted over 600 experimental data runs to optimize and tune the parameters of the DAS algorithm. These internal assessments of the DAS were informed by various applications such as enforcement of the Voting Rights Act (Box 4-1), the creation of population estimates and projections, and demographic reasonableness analysis.

[29] John M. Abowd and Victoria A. Velkoff, "Modernizing Disclosure Avoidance: A Multipass Solution to Post-Processing Error," U.S. Census Bureau, Washington, DC, 2020, <www.census.gov/newsroom/blogs/research-matters/2020/06/modernizing_disclosu.html>.

[30] Committee on National Statistics, workshop on "2020 Census Data Products: Data Needs and Privacy Considerations," <https://sites.nationalacademies.org/DBASSE/CNSTAT/DBASSE_196518>.

[31] More information on "Developing the DAS: Demonstration Data and Progress Metrics" is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-development.html>.

Box 4-1. Data for the Voting Rights Act

The published data from the 2020 Census are available for jurisdictions to use in devising redistricting plans for offices from the U.S. House of Representatives to local school boards and for the analysis of such plans by the U.S. Department of Justice (DOJ) for compliance with federal voting rights laws, including the Voting Rights Act of 1965, Title 52 U.S. Code, Section 10301. To assess the effect of the Disclosure Avoidance System on redistricting data, U.S. Census Bureau researchers measured the effects of applying the production version of the TopDown Algorithm (TDA) to the 2010 Census data by analyzing the results using previous redistricting plans provided by the DOJ.

Their starting point for this analysis was the published 2010 Census Redistricting Data (Public Law 94-171) Summary File that resulted from applying data swapping to the 2010 Census Edited File (CEF). The comparison to published data, rather than the CEF, allows for external data users to replicate or extend the analysis. In addition, block-level counts of total population and population aged 18 and over were the same in the 2010 CEF and the published data. (Note that while this analysis relied on comparisons to published, swapped data, our internal team did conduct additional analyses that compared the differentially private data to the unswapped CEF with similar results.)

Next, the researchers used data where the TDA (production version) had been applied to the 2010 CEF 25 different times. The TDA adds noise randomly and there was interest in how results would vary among the 25 runs. The privacy-loss budget for each run of the TDA was ε=17.41 (rho=2.56, delta=10-10) for the person file. An explanation of the privacy-loss budget is available in Technical Appendix A.

Thus, the researchers had 26 different national datasets—one where the 2010 CEF had been treated with data swapping and 25 where the 2010 CEF had been treated 25 different times with the production version of the TDA. Their approach had two parts: (1) to report observations on variability of results among the 25 runs of the TDA relative to the average of the 25 runs, and (2) to report observations on variability between the results among the 25 runs of the TDA relative to the data swapping (i.e., the published 2010 Census Redistricting Data [P.L. 94-171] Summary File data).

In the first part of their analysis, the researchers sought to determine the minimum population size necessary for geographic areas to have reliable demographic characteristics for the purposes of redistricting. Examining census block groups as well as places and minor civil divisions (MCDs), they demonstrated that for any block group with a total population between 450 and 499 people or larger, and for MCDs and places between 200 and 249 or larger, the difference in the largest demographic group as a proportion of the total population between the published 2010 Census tabulations and the 2010 Demonstration Privacy-Protected Microdata File (2021-06-08) is less than or equal to 5 percentage points at least 95 percent of the time. No congressional or state legislative district fails this test; that is, for these districts, the 5-percentage-point criterion holds 100 percent of the time.

The second part of their analysis examined districts in Rhode Island and in three specific jurisdictions provided by the DOJ. The three cases are Panola County, MS (2,180 blocks); Tate County (School District), MS (784 blocks); and Tylertown (Walthall County), MS (136 blocks). Additional jurisdictions of various sizes were also included in internal reviews but were not the subject of this particular analysis. Overall, the researchers observed empirically "that variability in data results from the TDA increases as we consider smaller pieces of geography and population" but the relative accuracy of the data increases substantially as the noisy block-level data are aggregated together into their jurisdictions. Specifically, for the Rhode Island districts analyses, they observed "that counts and percentages put in place from swapping being applied to the 2010 CEF have very similar counts and percentages after the TDA is applied to the same 2010 CEF." Moreover, variability with the 2021-04-28 version of the TDA (privacy-loss budget ε=10.3) is less than what they reported with the 2019-10-31 version (privacy-loss budget ε=4.0).

Overall, the comparisons showed that differences from the 2010 Census Public Law 94-171 data decreased as geographic and population size increased.

Census Bureau researchers also examined the impact of the TDA production settings on the ability to identify majority-minority districts (districts in which a demographic group constitutes a majority of the total population or of the voting-age population). This research examined the proportion of 26 race and Hispanic origin demographic categories in each of the nation's 436 congressional districts (including the District of Columbia's nonvoting delegate district), 1,946 state upper legislative districts, and 4,785 state lower

legislative districts, comparing the published 2010 Census tabulations to the 2010 Demonstration Data Privacy-Protected Microdata File (2021-06-08) with the production settings. Comparing these data, researchers identified 25 districts out of 7,167 (0.3 percent of all districts) where a demographic group could be considered to flip from having a majority in the published 2010 Census tabulations to being a minority in the demonstration data or vice versa. In every case, slight changes to the district boundaries could restore the original determination and the boundaries represent what was drawn with the original data, not what would have been drawn had the differentially private data been the basis. Flips occurred in both directions (11 groups went from majority to minority, 14 went from minority to majority). No flips involved both a racial or ethnic group's total population and their voting-age population; that is, districts drawn such that a demographic group constitutes a majority relative to both the total population and to the voting-age population are more stable. All observed flips involved very small numbers of individuals in districts that were tightly drawn (usually within a few hundredths of a percent of the 50 percent mark) using the published 2010 Census tabulations (a level of precision that would be greatly impacted by the noise injected into racial and Hispanic origin characteristics by the 2010 Census swapping algorithms). Detailed results from these analyses are available in two working papers available on the Census Bureau's Web site and on a recorded Webinar.[1]

[1] Tommy Wright and Kyle Irimata, "Empirical Study of Two Aspects of the TopDown Algorithm Output for Redistricting: Reliability & Variability," Working paper #2021-01, U.S. Census Bureau, Washington, DC, 2021, <www.census.gov/library/working-papers/2021/adrm/SSS2021-01.html>; Tommy Wright and Kyle Irimata, "Empirical Study of Two Aspects of the TopDown Algorithm Output for Redistricting: Reliability & Variability (August 5, 2021 Update)," Working paper #2021-02, U.S. Census Bureau, Washington, DC, 2021, <www.census.gov/library/working-papers/2021/adrm/SSS2021-02.html>; U.S. Census Bureau Webinar, "Understanding the 2020 Census Disclosure Avoidance System: Analysis of Production Settings for Redistricting and Voting Rights Act Use Cases," Recorded August 10, 2021, available at <www.census.gov/data/academy/webinars/2021/disclosure-avoidance-series/analysis-of-demonstration-data-for-redistricting-and-voting-rights-act-use-cases-production-settings.html>.

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5. FREQUENTLY ASKED QUESTIONS

This section provides answers to some frequently asked questions about disclosure avoidance. The U.S. Census Bureau also provides a wealth of information about disclosure avoidance on its "Frequently Asked Questions" and "2020 Census Data Products: Disclosure Avoidance Modernization" Web pages.[32]

How is a differentially private system different from the Census Bureau's prior disclosure avoidance techniques?

The disclosure avoidance techniques that were used in the 2010 Census and in the American Community Survey rely on "swapping" characteristics in the underlying data between a subset (millions) of households in different geographic areas. In this era of Big Data, these methods are insufficient. Were we to use our prior disclosure avoidance techniques, the amount of noise we would have to inject into the data to comply with our statutory confidentiality obligations would make census data unfit for most uses.

With the current method, the noise is added to the statistics in the tables themselves. This allows the U.S. Census Bureau to precisely control the amount of noise that we add. By documenting the properties of this noise, we can help data users determine if published estimates are suitable for their specific applications. We call this assuring "fitness for use." Documenting the impact of this noise is similar to the way we provide margins of error for our current statistical products. For the same level of protection, a differentially private 2020 dataset will be significantly more accurate than datasets produced using our prior disclosure avoidance methods.

Do 2020 Census state population totals reflect actual reported totals, exempted from disclosure avoidance methods?

Yes. As always, state population totals from the 2020 Census will reflect the actual population numbers as enumerated in the census. The totals determine congressional apportionment and are protected only by aggregation. We call such statistics "invariants," meaning that their value will not be modified by the Disclosure Avoidance System. We use invariants sparingly in our disclosure avoidance algorithms as they impact the calibration of noise that must be applied to other statistics and weaken the overall confidentiality guarantee.

How did the Census Bureau involve data users in the design of the Disclosure Avoidance System (DAS)?

The U.S. Census Bureau's Data Stewardship Executive Policy Committee (DSEP) relies on input from a variety of sources when making decisions about the adoption, implementation, and parameters of the DAS. These include internal subject matter experts, the Census Bureau's advisory panels (the National Advisory Committee on Racial, Ethnic, and Other Populations and the Census Scientific Advisory Committee), the Committee on National Statistics of the National Academy of Sciences, academic experts and researchers, privacy advocates, professional associations, federal and state partners (including the DOJ with regards to Voting Rights Act matters), and many others. We also solicited public comments in a July 2018 Federal Register notice and have conducted formal consultations with American Indian and Alaska Native tribal leaders.

Engagement with these and other stakeholders is ongoing. The Census Bureau will continue to solicit and consider feedback to improve our disclosure avoidance methods. This process of enhanced data user engagement in the design and implementation of disclosure avoidance methods marks a significant shift from prior censuses, where data users were largely unaware of the impact of the methods being applied.

How will the Disclosure Avoidance System work for other 2020 Census products?

TopDown Algorithm as designed can provide consistency between redistricting data and other 2020 Census data products, such as the Demographic Profile and Demographic and Housing Characteristic File (DHC). However, methods for disclosure avoidance in the DHC files were not finalized at the time of publication.

Future data products will include additional data on household and relationship-to-householder characteristics, age detail, and other demographic and housing information.

The U.S. Census Bureau will continue to seek input from stakeholders as they make decisions about disclosure avoidance procedures for these products.

[32] More information on "Frequently Asked Questions" is available at <https://ask.census.gov>. More information on "2020 Census Data Products: Disclosure Avoidance Modernization" is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance.html>.

What harms could arise if the basic demographic data collected in the decennial census is exposed?

Data stewardship is a comprehensive framework designed to protect information over the course of the information life cycle, from collection to dissemination, and it starts with a commitment to confidentiality that is required by law and designed to maintain public trust. Research conducted by both the U.S. Census Bureau and nongovernmental researchers has shown that concerns about privacy and confidentiality are among the reasons most often given by potential respondents for unwillingness to participate in surveys and censuses.[33, 34]

In addition to the impact of confidentiality protections on response rates, our disclosure avoidance system protects against direct threats to the disclosure of our respondents' data. Many vendors collect, sell, and publish data about people living in the United States. While many commercial vendors have access to their own data on name, address, and date of birth, fewer vendors have access to the type of rich demographic data the census collects on characteristics like race, ethnicity, and household relationships.

The information on demographic characteristics these vendors lack is precisely the sort of information collected by the decennial census. The disclosure of these types of characteristics could not only make it easier to target individuals—particularly in vulnerable populations such as communities of color, same-sex couples, older adults, or parents of very young children—for fraud, enforcement actions, disinformation, or physical or virtual abuse, but it could also undermine the public's trust in the confidentiality of its census response, which could cause people to be less likely to respond to future censuses.

Could external attackers know whether they've correctly re-identified individuals in census data even if the attackers don't have access to confidential census records?

Yes, if they have access to additional outside data sources or perform some minimal fieldwork to verify their results.[35] Vulnerability of the published data to reconstruction of the confidential microdata could be an unintentional violation of existing disclosure avoidance rules for published microdata that were in place for the 2010 Census. Re-identification of those records is not required to trigger strengthening the necessary disclosure avoidance standards for tabular data releases.

This is one reason why the U.S. Census Bureau must seriously address the threat of disclosure and apply a comprehensive and coordinated program of disclosure avoidance.

The Census Bureau has the only copy of the confidential microdata, but an adversary could have access to many different outside data sources. Unless we protect the data, an adversary could independently confirm their re-identifications with reasonable certainty.

As the volume and quality of outside data sources—such as names, addresses, and birth dates—grow and improve, so do adversaries presumed and actual matches. Our analysis of 2010 Census re-identification vulnerability used a large database of commercial information available at the time of that census. The risks associated with using 2010 disclosure avoidance methods today and into the future will only increase.

Is there any evidence of successful re-identifications by attackers?

To date, we are not aware of successful re-identifications by bad actors, though we would not necessarily expect bad actors to publicize their results. We have, however, documented re-identifications that users have brought to our attention through Reidentification Studies.[36] There has been a dramatic increase in the availability of both large-scale computing resources and commercial-strength optimizers that can solve systems of billions of simultaneous equations.

Together, these resources and tools have changed the threat of database reconstruction from a theoretical risk to an issue that the U.S. Census Bureau must address. The adoption of differential privacy for 2020 Census data releases is intended to guard against successful reconstructions and re-identifications by those who seek to reverse-engineer the census data. This includes those who would be especially difficult to identify like state actors (e.g., foreign governments), corporations, and cybercriminals, all of whom would be unlikely to publicly announce a successful reconstruction or re-identification attack.

[33] More information on research conducted by the Census Bureau is available at <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/plan/final-analysis/2020-report-cbams-study-survey.html>.

[34] More information on nongovernmental researchers is available at <www.srl.uic.edu/newsletter/issues/2000s/04v35n2-3.pdf>.

[35] Simson L. Garfinkel, "De-Identification of Personal Information," NISTIR 8053, National Institute of Standards and Technology, Washington, DC, 2015, <https://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.8053.pdf>.

[36] More information on Reidentification Studies is available at <www.census.gov/library/working-papers/2019/adrm/2019-04-ReidentificationStudies.html>.

Why is the Census Bureau adopting modernized disclosure avoidance for the 2020 Census instead of waiting until the 2030 Census?

Our research verified that traditional disclosure avoidance methods leave personal data exposed with today's faster computers, high-powered machine learning software, and large public databases. This left us with two choices: we could publish significantly less information, or we could adopt a modernized approach to confidentiality protection. We chose the latter, and there is no other statistical technique that can be reliably employed to assure the confidentiality of the underlying data while simultaneously assuring the highest quality statistical product for our data users.

The U.S. Census Bureau has a dual mandate to produce quality statistical information and protect the confidentiality of respondent data. We know that the nation needs timely and accurate information to make informed decisions. People have to know that we will safeguard their privacy and the confidentiality of their data zealously if we want them to entrust us with their personal information.

Can I compare 2020 Census data with previous census data?

Yes, data users can compare 2020 Census data with data from prior censuses. Data users should be cautious about drawing strong inferences based on changes observed for very small geographies, such as blocks, as they will tend to have a higher amount of noise relative to larger areas. As with every census, data users should review guidance regarding methodology changes, geographic boundary changes, etc., when making comparisons.

Can I compare 2020 Census data and American Community Survey data?

Yes, data users can compare 2020 Census data with estimates from the American Community Survey. Data users should keep in mind the differences between the two sources. For example, the American Community Survey includes sampling error, whereas the decennial census does not.

How do I calculate the accuracy of user-defined geographies based on the published data?

As in prior censuses, data users may combine tabulated quantities from several geographies to create information about new user-defined geographies. Users should be advised, however, that the accuracy of these combined tabulations will depend on both the overall population size of the created geography and the created geography's distance from the geographic spine.[37] Generally, areas that include more people and areas with boundaries closer to tract or county geographies have more relative accuracy.

Technical users may download demonstration data, called privacy-protected microdata files (PPMFs), that have run 2010 Census data through the 2020 Disclosure Avoidance System software. The latest PPMF vintage 2021-06-08 is the Production Settings run, which uses the same software and settings for the 2020 production run of the redistricting data. Users can compare tabulated values from the PPMFs to published 2010 data to identify the amount of uncertainty that can be expected for a given geography or characteristic. Users can also calculate new measures of the spread of the uncertainty. For example, comparing tabulations from the PPMFs with the published 2010 data will show that 90 percent of counties have a privacy-protected total population that is within ± four people of their published total population.

The latest summary metrics are available at Developing the DAS: Demonstration Data and Progress Metrics <www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-development.html>.

[37] John M. Abowd et al., "Geographic Spines in the 2020 Census Disclosure Avoidance System Topdown Algorithm," Working Paper CED-21-01, U.S. Census Bureau, Washington, DC, 2021, <www.census.gov/library/working-papers/2021/adrm/geographic-spines.html>.

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6. ADDITIONAL RESOURCES

2020 Census Data Products: Disclosure Avoidance Modernization

<www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance.html>

2020 Census Results

<www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-results.html>

2020 Decennial Census Visualizations and Infographics

<www.census.gov/programs-surveys/decennial-census/decade/2020/2020-visualizations.html>

2020 Census State Redistricting Data (Public Law 94-171) Summary File

<https://www2.census.gov/programs-surveys/decennial/2020/technical-documentation/complete-tech-docs/summary-file/2020Census_PL94_171Redistricting_StatesTechDoc_English.pdf>

Developing the DAS: Demonstration Data and Progress Metrics

<www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-development.html>

Disclosure Avoidance Techniques Used for the 1960 Through 2010 Census

<www.census.gov/library/working-papers/2019/adrm/six-decennial-censuses-da.html>

A History of Census Privacy Protections

<www.census.gov/library/visualizations/2019/comm/history-privacy-protection.html>

Census Protections Evolve Continuously to Address Emerging Threats

<www.census.gov/library/stories/2020/02/through-the-decades-how-the-census-bureau-protects-your-privacy.html>

2020 Disclosure Avoidance System Updates

<www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-updates.html>

GitHub Repository

<https://github.com/uscensusbureau/census2020-das-2010ddp>

Redistricting Data Program

<www.census.gov/rdo>

Decennial Census P.L. 94-171 Redistricting Data

<www.census.gov/programs-surveys/decennial-census/about/rdo/summary-files.html#P1>

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7. GLOSSARY

Accuracy. One of four key dimensions of survey quality. Accuracy refers to the difference between the published estimate and the true value. Attributes are measured in terms of sources of error (for example, coverage, sampling, nonresponse, measurement, processing, and disclosure avoidance). Throughout this handbook, we use accuracy in the context of the Disclosure Avoidance System to refer to difference between the published data and the as-enumerated data.

Block group. A statistical subdivision of a census tract, generally defined to contain between 600 and 3,000 people and between 240 and 1,200 housing units, and the smallest geographic unit for which the U.S. Census Bureau tabulates sample data. A subdivision of a census tract (or, before 2000, a block numbering area), a block group is a cluster of blocks having the same first digit of their four-digit identifying number within a census tract.

Census Edited File (CEF). A file created by implementing edits and characteristic imputation on the CEF. Edits are used to ensure certain consistencies among characteristics. Characteristics imputation is used to ensure that each person and housing unit on the final census file has valid values in the person and housing items—sex, age, date of birth, Hispanic origin, race, relationships to householder, group quarters type, tenure, and detailed vacancy status.

Census geography. A collective term referring to the types of geographic areas used by the U.S. Census Bureau in its data collection and tabulation operations. With connecting lines, the diagram in the "Geographies and the Geographic Spine" section shows the hierarchical relationships between geographic types. For example, a line extends from states to counties because a state is comprised of many counties, and a county can never cross a state boundary.

If no line joins two geographic types, then an absolute and predictable relationship does not exist between them. For example, many places do not cross a county boundary (i.e., only one county). However, some places extend over more than one county like New York City. Therefore, an absolute hierarchical relationship does not exist between counties and places, and any tabulation involving both of these geographic types may represent only a part of one county or one place.

Census tract. A small, relatively permanent statistical subdivision of a county delineated by a local committee of census data users for presenting data. Census tracts nest within counties and their boundaries normally follow visible features but may follow legal geography boundaries and other nonvisible features in some instances. Census tracts ideally contain about 4,000 people and 1,600 housing units.

Confidentiality. The confidentiality of census data is protected under Title 13 of the U.S. Code, which prohibits the U.S. Census Bureau from disclosing any "information reported by, or on behalf of, any particular respondent" and from "(making) any publication whereby the data furnished by any particular establishment or individual under this title can be identified."[38]

Data swapping. A disclosure avoidance method used for prior censuses that "swaps" data between households in different locations that have similar characteristics on a set of variables. Which households were swapped is not public information. The selection process is highly targeted, so it is most often applied to the data with the highest disclosure risk. Often, swapping occurs within a specific geographic area so there is no effect on the population or characteristics totals for that geographic area. Because of data swapping, users should expect that tables with cells having a value of one or two do not reveal information about specific individuals. As a consequence, these cells typically do not have a high degree of accuracy.

Decennial census. The census of population and housing, taken by the U.S. Census Bureau in years ending in 0 (zero). Article I of the Constitution requires that a census be taken every 10 years for the purpose of reapportioning the U.S. House of Representatives among the states.

Differential privacy. The scientific term for a mathematical framework that quantifies the disclosure risk associated with each published statistic. By quantifying the disclosure risk of the statistics we publish, we can then use statistical noise to slightly alter the data so the link between the data and a specific person or business can't be certain. Differentially private disclosure avoidance methods precisely control the amount of statistical noise added using sophisticated mathematical formulas to assure that enough noise is added to protect confidentiality but not so much as to damage the statistical validity of our publications. The idea of using statistical noise to protect confidentiality is not new. The U.S. Census Bureau has used similar techniques for decades.

[38] Title 13 U.S. Code, Sections 8–9.

Disclosure avoidance. Statistical methods used to treat data prior to release to ensure the confidentiality of responses.

Editing and imputation. Editing is the process of ensuring consistencies among characteristics for a person or people in a household. Characteristic imputation is the process used to fill in missing or misreported data via assignment, allocation, or substitution.

Epsilon. A measure of privacy loss. Higher values of epsilon result in more privacy loss, whereas lower values result in less privacy loss. Epsilon may also be referred to as the privacy-loss budget, although in the TopDown Algorithm, the privacy-loss budget is allocated using the parameter rho defined in Zero-Concentrated Differential Privacy.

Group quarters (GQ) facilities. A GQ facility is a place where people live or stay that is normally owned or managed by an entity or organization providing housing and/or services for the residents. These services may include custodial or medical care, as well as other types of assistance. Residency is commonly restricted to those receiving these services. People living in GQ facilities are usually not related to one another. There are two general categories of group quarters facilities: institutional group quarters (such as correctional facilities) and noninstitutional group quarters (such as college/university student housing).

Group quarters population. Includes all people living in group quarters instead of housing units. Group quarters are places where people live or stay, in a group living arrangement that is owned or managed by an entity or organization providing housing and/or services for the residents.

Housing unit. A housing unit is a house, an apartment, a mobile home or trailer, a group of rooms, or a single room occupied as separate living quarters, or if vacant, intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have direct access from outside the building or through a common hall. For vacant units, the criteria of separateness and direct access are applied to the intended occupants whenever possible.

Indirect identification. Indirect identification refers to using information in conjunction with other data elements to reasonably infer the identity of a respondent. For example, data elements, such as a combination of gender, race, date of birth, geographic indicators, or other descriptors, may be used to identify an individual respondent.

Invariant. A number reported exactly as enumerated.

Post-processing. In the context of disclosure avoidance, a process used by the U.S. Census Bureau to impose certain consistencies on the published data (for example, ensuring that the population for counties within a state sums up to the state's total population, converting protected tables to microdata).

Privacy-loss budget. A measure of global disclosure risk. Higher values for the privacy-loss budget result in more privacy loss, whereas lower values result in less privacy loss. Privacy-loss budget may also be referred to as epsilon or, in the case of the TopDown Algorithm as rho, a related parameter.

Rho. A measure of disclosure risk used in the Zero-Concentrated Differential Privacy framework that is used by the TopDown Algorithm. Higher values of rho result in more disclosure risk, whereas lower values result in less privacy loss. Rho may also be referred to as the privacy-loss budget.

Table suppression and cell suppression. When published statistics could result in potential disclosure of individual information, it may be necessary to suppress data from publication—either by suppressing cells within a table or suppressing entire tables of data. Refer to "Disclosure avoidance" above.

Top- and bottom-coding. Top- and bottom-coding refer to the practice of not reporting the largest (or smallest) characteristics, but grouping those with others near the top, such as reporting household sizes 1 through 3, but then reporting 4 or more to include sizes 4, 5, 6, etc.

TopDown Algorithm. An algorithm used by the U.S. Census Bureau based on the privacy-loss accounting framework of Differential Privacy that injects noise into 2020 Census data to protect the confidentiality of respondents.[39]

[39] DAS 2020 Redistricting Production Code Release, <https://github.com/uscensusbureau/DAS_2020_Redistricting_Production_Code>.

8. TECHNICAL APPENDIX A: THE PRIVACY-LOSS BUDGET FOR 2020 REDISTRICTING DATA

To achieve a given level of confidentiality protection (i.e., set the maximum possible amount of disclosure risk for a given dataset), the privacy-loss budget (PLB) acts like a dial that impacts the range of random noise that is drawn from a statistically defined probability distribution (Figure 8.1). Higher values of PLB imply more accuracy and less confidentiality. As the PLB (reflected in the terms epsilon or rho) rises, the increasingly peaked shape of the distribution means that the noise added to any given cell is increasingly likely to be zero. Lower values of PLB imply less accuracy/more protection, as the noise distribution spreads out away from zero, and larger amounts of noise added to a cell become increasingly likely. In the most extreme cases, a PLB of zero would reflect complete noise with no accuracy. A PLB value of infinity would reflect complete accuracy with no noise.

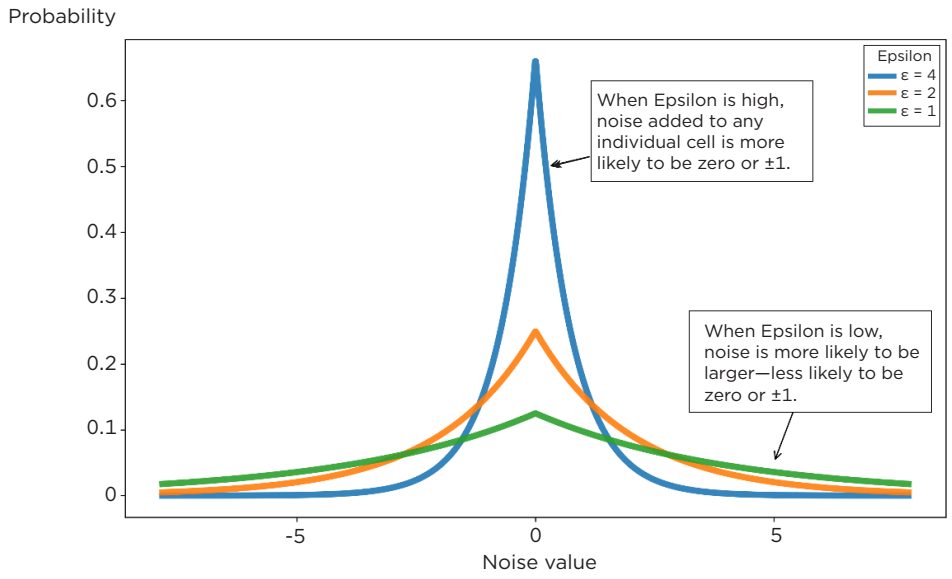
The privacy-loss budget is not the only factor that influences the shape of the distribution. The type of distribution (such as Laplace, geometric, or Gaussian) also plays a role. In "pure" differential privacy, the statistical distributions that are most commonly used, such as Laplace, allow for sizeable "outliers"—places where the amount of noise added is unusually large (very far from 0 or ±1).

For the purposes of decennial census data, confidentiality concerns need to be balanced with the accuracy of the data and adding large amounts of noise to some cells may harm the data's fitness for use.

To address this issue, the U.S. Census Bureau chose to implement a framework of Zero-Concentrated Differential Privacy (zCDP), based on a different statistical distribution (discrete Gaussian). This shift means that for the same level of privacy-loss budget, zCDP has lower probability of injecting unusually large amounts of noise than pure differential privacy would.[40]

[40] Statisticians would refer to this as the zCDP distribution having thinner "tails" (lower probability that an observation will be very far from zero) than the distributions most commonly used in pure differential privacy.

Figure 8.1. **The Privacy-Loss Budget (Epsilon) Acts as a Dial on the Level of Noise**



Source: U.S. Census Bureau.

The switch to zCDP significantly reduces the likelihood of outliers, yielding substantially greater accuracy for comparable privacy risk. It does so in part by modifying the mechanics of the mathematical guarantee.

The privacy-loss budget is often referred to by a single value of epsilon or rho for the entire dataset, but the budget itself is allocated across various dimensions of the dataset. Within the mechanics of zCDP, the privacy-loss budget is allocated to queries using the parameter, rho. Through the inclusion of a third parameter delta, which interprets the strength of the privacy guarantee represented by rho, rho can be used to calculate the global epsilon for any given value of delta.

For the 2020 Census Public Law 94-171 redistricting files, the privacy-loss budget was allocated as shown below, where the fractions in each cell represent the share of privacy-loss budget allocated.

Privacy-Loss Budget Allocations for the P.L. 94-171 Redistricting Data: United States

Global Privacy-Loss Budget: People

Global rho	2.56
Global epsilon	17.14
Delta	10^{-10}

Source: U.S. Census Bureau.

Privacy-Loss Budget: People

Geographic level	Rho allocation
United States	104/4,099
State	1,440/4,099
County	447/4,099
Tract	687/4,099
Optimized block group[1]	1,256/4,099
Block	165/4,099

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Query Privacy-Loss Budget: People

Query	Geographic level and rho allocation					
	United States	State	County	Tract	Optimized block group[1]	Block
TOTAL (1 cell)[2]	N	3,773/4,097	3,126/4,097	1,567/4,102	1,705/4,099	5/4,097
CENRACE (63 cells)	52/4,097	6/4,097	10/4,097	4/2,051	3/4,099	9/4,097
HISPANIC (2 cells)	26/4,097	6/4,097	10/4,097	5/4,102	3/4,099	5/4,097
VOTINGAGE (2 cells)	26/4,097	6/4,097	10/4,097	5/4,102	3/4,099	5/4,097
HHINSTLEVELS (3 cells)	26/4,097	6/4,097	10/4,097	5/4,102	3/4,099	5/4,097
HHGQ (8 cells)	26/4,097	6/4,097	10/4,097	5/4,102	3/4,099	5/4,097
HISPANIC*CENRACE (126 cells)	130/4,097	12/4,097	28/4,097	1,933/4,102	1,055/4,099	21/4,097
VOTINGAGE*CENRACE (126 cells)	130/4,097	12/4,097	28/4,097	10/2,051	9/4,099	21/4,097
VOTINGAGE*HISPANIC (4 cells)	26/4,097	6/4,097	10/4,097	5/4,102	3/4,099	5/4,097
VOTINGAGE*HISPANIC*CENRACE (252 cells)	26/241	2/241	101/4,097	67/4,102	24/4,099	71/4,097
HHGQ*VOTINGAGE*HISPANIC*CENRACE (2,016 cells)	189/241	230/4,097	754/4,097	241/2,051	1,288/4,099	3,945/4,097

N Not applicable.

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

[2] The TOTAL query (total population) is held invariant at the state level. This note pertains to the interpretation of the entry in the State column of this row only. This rho allocation assigned to TOTAL at the state level is the amount assigned to the state-level queries for the total population of all American Indian and Alaska Native (AIAN) tribal areas within the state and for the total population of the remainder of the state, for the 36 states that include AIAN tribal areas.

Source: U.S. Census Bureau.

Global Privacy-Loss Budget: Units

Global rho	0.07
Global epsilon	2.47
Delta	10^{-10}

Source: U.S. Census Bureau.

Privacy-Loss Budget: Units

Geographic level	Rho allocation
United States	1/205
State	1/205
County	7/82
Tract	364/1,025
Optimized block group[1]	1,759/4,100
Block	99/820

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Query Privacy-Loss Budget: Units

Query	Geographic level and rho allocation					
	United States	State	County	Tract	Optimized block group[1]	Block
Detail (2 cells)	1/1	1/1	1/1	1/1	1/1	1/1

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Attribute Epsilons

Attribute	Epsilon allocation
HHGQ	7.24
VOTINGAGE	7.57
HISPANIC	10.04
CENRACE	10.08
H1	2.47

Source: U.S. Census Bureau.

Cross-Universe Epsilons: People + Units

Geographic level	Epsilon allocation
Block within block group	3.06
Block within tract	9.62
Block within county	12.04
Block within state	13.40
Block within United States	17.18
All levels	**17.44**

Source: U.S. Census Bureau.

Cross-Universe Rho: People + Units

Geographic level	Rho allocation
Block within block group	0.11
Block within tract	0.93
Block within county	1.38
Block within state	1.67
Block within United States	2.56
All levels	**2.63**

Source: U.S. Census Bureau.

Privacy-Loss Budget Allocations for the P.L. 94-171 Redistricting Data: Puerto Rico

Global Privacy-Loss Budget: People

Global rho	2.56
Global epsilon	17.14
Delta	10^{-10}

Source: U.S. Census Bureau.

Privacy-Loss Budget: People

Geographic level	Rho allocation
Puerto Rico	689/4,099
Municipio	695/4,099
Tract	772/4,099
Optimized block group[1]	1,778/4,099
Block	165/4,099

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Query Privacy-Loss Budget: People

Query	Geographic level and rho allocation				
	Puerto Rico	Municipio	Tract	Optimized block group[1]	Block
TOTAL (1 cell)	N	3,126/4,097	1,467/4,102	1,876/4,103	5/4,097
CENRACE (63 cells)	11/108	10/4,097	13/4,102	4/4,103	9/4,097
HISPANIC (2 cells)	11/108	10/4,097	1/586	4/4,103	5/4,097
VOTINGAGE (2 cells)	11/108	10/4,097	1/586	4/4,103	5/4,097
HHINSTLEVELS (3 cells)	11/108	10/4,097	1/586	4/4,103	5/4,097
HHGQ (8 cells)	11/108	10/4,097	1/586	4/4,103	5/4,097
HISPANIC*CENRACE (126 cells)	53/513	28/4,097	866/2,051	749/4,103	21/4,097
VOTINGAGE*CENRACE (126 cells)	53/513	28/4,097	15/2,051	10/4,103	21/4,097
VOTINGAGE*HISPANIC (4 cells)	11/108	10/4,097	1/586	4/4,103	5/4,097
VOTINGAGE*HISPANIC*CENRACE (252 cells)	56/513	101/4,097	50/2,051	27/4,103	71/4,097
HHGQ*VOTINGAGE*HISPANIC*CENRACE (2,016 cells)	25/342	754/4,097	725/4,102	1,417/4,103	3,945/4,097

N Not applicable.

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Global Privacy-Loss Budget: Units

Global rho	0.07
Global epsilon	2.47
Delta	10^{-10}

Source: U.S. Census Bureau.

Privacy-Loss Budget: Units

Geographic level	Rho allocation
Puerto Rico	5,047/876,580
Municipio	18,746/219,145
Tract	94,451/262,974
Optimized block group[1]	281,911/657,435
Block	99/820

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products wil be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Query Privacy-Loss Budget: Units

Query	Geographic level and rho allocation				
	Puerto Rico	Municipio	Tract	Optimized block group[1]	Block
Detail (2 cells)	1/1	1/1	1/1	1/1	1/1

[1] The Optimized Block Groups used within the TopDown Algorithm differ from tabulation block groups. These differences improve accuracy for "off-spine" geographies like places and minor civil divisions. The use of optimized block groups for measurement and post-processing within the TopDown Algorithm does not impact how the resulting data will be tabulated. All census data products will be tabulated using the official tabulation block groups as defined by the Census Bureau's Geography Division.

Source: U.S. Census Bureau.

Per Attribute Epsilons

Attribute	Epsilon allocation
HHGQ	8.69
VOTINGAGE	9.49
HISPANIC	11.65
CENRACE	11.69
H1	2.47

Source: U.S. Census Bureau.

Cross-Universe Rho: People + Units

Geographic level	Rho allocation
Block within block group	0.11
Block within tract	1.25
Block within municipio	1.76
Block within Puerto Rico	2.20
All levels	**2.63**

Source: U.S. Census Bureau.

Cross-Universe Epsilons: People + Units

Geographic level	Epsilon allocation
Block within block group	3.06
Block within tract	11.39
Block within municipio	13.82
Block within Puerto Rico	15.72
All levels	**17.44**

Source: U.S. Census Bureau.

EXHIBIT E

EXHIBIT E

SCIENCE ADVANCES | RESEARCH ARTICLE

SOCIAL SCIENCES

The use of differential privacy for census data and its impact on redistricting: The case of the 2020 U.S. Census

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Census statistics play a key role in public policy decisions and social science research. However, given the risk of revealing individual information, many statistical agencies are considering disclosure control methods based on differential privacy, which add noise to tabulated data. Unlike other applications of differential privacy, however, census statistics must be postprocessed after noise injection to be usable. We study the impact of the U.S. Census Bureau's latest disclosure avoidance system (DAS) on a major application of census statistics, the redrawing of electoral districts. We find that the DAS systematically undercounts the population in mixed-race and mixed-partisan precincts, yielding unpredictable racial and partisan biases. While the DAS leads to a likely violation of the "One Person, One Vote" standard as currently interpreted, it does not prevent accurate predictions of an individual's race and ethnicity. Our findings underscore the difficulty of balancing accuracy and respondent privacy in the Census.

INTRODUCTION

In preparation for the official release of the 2020 Census data, the U.S. Census Bureau has developed a disclosure avoidance system (DAS) to prevent Census responses from being linked to specific individuals (*1*). The DAS is based on differential privacy technology, which adds a certain amount of random noise to Census tabulations. The Bureau has been required by law to prevent the disclosure of information about Census participants (13 U.S. Code § 9) and has implemented disclosure avoidance methods since 1960. However, their decision to incorporate differential privacy and the necessary subsequent postprocessing steps in the 2020 Census, as implemented in the DAS, has been controversial. Some scholars have voiced concerns about the potential negative impacts of noisy data on public policy and social science research, which critically rely upon Census data (*2*–*6*).

The U.S. decennial census serves as an important and unique case study on the impact of differential privacy. Its statistics define the drawing of legislative districts, determine the distribution of federal funds for more than a hundred government programs, and are extensively analyzed by social scientists (*7*, *8*). Other countries and international organizations, including the European Union, United Kingdom, and Australia, have adopted or are considering the adoption of differential privacy technology (*9*–*11*). In addition to its decennial census, the U.S. Census Bureau has recently used differential privacy as their "privacy definition" in a national block-level data release on commuting patterns (*12*). The Bureau is now considering adopting a similar approach for other data products, such as the American Community Survey (*13*).

It is a common misconception that a differentially private census only involves injecting random noise (*14*, *15*). Simple noise injection may lead to geographies with negative population values, create small discrepancies in population counts even at high levels of aggregation like states, and create inconsistencies across millions of tabulations that the Census must publish. Therefore, the U.S. Census Bureau has adjusted its differentially private counts with various postprocessing steps to prevent these negative counts and ensure that population counts at several geographies are exact and tables are consistent. Although this postprocessing is not formally part of differential privacy, the two are inseparable because national statistical agencies must ensure the facial validity of census products while simultaneously protecting respondents' privacy. The question is whether these sensible adjustments unintentionally induce systematic (instead of random) discrepancies in reported Census statistics (*16*).

Here, we empirically evaluate the impact of the DAS, both the noise injection and postprocessing, on redistricting and voting rights analysis across local, state, and federal contexts. These districts vary greatly in their size and underlying geographies. This heterogeneity makes redistricting an interesting case for assessing the impact of differential privacy in national statistical products. Although the Census Bureau plans to only release the DAS-protected 2020 Census tabulations, in April 2021, they published a DAS version of the 2010 tabulations to collect public comment. Using these demonstration data, we conduct our empirical evaluation under a likely scenario, in which practitioners, map drawers and analysts alike, treat these DAS-protected data "as is" as they have done in the past, without accounting for the DAS noise generation mechanism.

First, we find systematic biases in the DAS-protected data along racial and partisan lines. The DAS has a tendency to transfer population across geographies in ways that artificially reduce racial and partisan heterogeneity. This is, in part, due to the postprocessing procedure, which gives a priority to the accuracy of population counts for the largest racial group in a given area.

Second, we use a set of recently developed simulation methods that can generate large numbers of realistic redistricting maps under a set of legal and other relevant constraints, including contiguity, compactness, population parity, and preservation of communities of interest and counties (*17*–*24*). These simulation methods are useful because they allow us to understand the systematic impacts of DAS on the redistricting process and evaluation by generating a large number of realistic redistricting plans under various conditions. They also have been extensively used by expert witnesses in recent

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court cases on redistricting, including *Common Cause* v. *Lewis* (2020), *Rucho* v. *Common Cause* (2019), *Ohio A. Philip Randolph Institute* v. *Householder* (2020), and *League of Women Voters of Michigan* v. *Benson* (2019).

We find that the noise introduced by the DAS can prevent map drawers from creating districts of equal population according to current statutory and judicial standards. For example, over the past half century, the Supreme Court has firmly established the principle of "One Person, One Vote", requiring states to minimize the population difference across districts based on the Census data. This applies even if differences are theoretically smaller than known enumeration error (*Karcher* v. *Daggett* 1983). In many cases, actual deviations from equal population, as measured using the original Census data, will be several times larger than as reported under the DAS-protected data. The magnitude of this problem is especially acute for smaller districts, such as state legislative districts and school boards.

The noise introduced by the DAS also has partisan and racial implications. We find that DAS yields unpredictable changes to district-level partisan outcomes and may change the conclusions of redistricting analyses used to identify partisan gerrymandering. Our analyses demonstrate that precincts that are heterogeneous along racial and partisan lines are systematically undercounted by the DAS. In some cases, these perturbations can lead to a change in the number of majority-minority districts (MMDs) if one follows the current standard set by courts (e.g., *Thornburg* v. *Gingles* 1986, *Shaw* v. *Reno* 1993, *Bartlett* v. *Strickland* 2009, and *Shelby County* v. *Holder* 2013).

Last, we find that the noise-induced DAS data do not degrade the overall prediction accuracy of individuals' race based on the Bayesian Improved Surname Geocoding (BISG) methodology, which combines the Census block-level proportion of each race with a voter's name and address (*25*–*27*). Redistricting analysis for voting rights cases often necessitates this individual-level prediction because most states' voter lists do not include individual race. We also show that the DAS-protected data can still alter individual-level race predictions constructed from voter names and addresses. These changes can have a large impact on the analysis of local redistricting cases. In a reanalysis of a recent Voting Rights Act case, we find that predictions generated using DAS-protected data underpredict minority voters and result in fewer MMDs.

We conclude by discussing the implications of our findings for future redistricting and voting rights analysis under the privacy-protected Census data. Our article represents the broadest look at the impact of the new DAS methodologies on redistricting use to date. Prior research applied related redistricting simulation methodologies to simulated DAS data, as we do, but used an old version of the DAS algorithm rather than the latest demonstration data release (*28*). These authors make a valuable contribution by demonstrating the continued usability of weighted regressions for voting rights analysis. While their primary focus is on the analysis of one county in one state, we cover several levels of redistricting across many states. We can thus examine the consequences of DAS-induced error across a variety of contexts and use cases.

RESULTS

Differential privacy and postprocessing

The Census Bureau has developed the TopDown algorithm as the DAS of the 2020 Census (*1*). The algorithm adds statistical noise to implement differential privacy and then makes postprocessing adjustments. Differentially private systems such as the Census DAS provide some protection against the risk of "reconstruction attacks," which attempt to identify a specific individual in the dataset using external information. We examine the April 2021 demonstration data before the Census release of 2020 P.L. 94-171 data, which many states use for redistricting. The demonstration data are a reprocessed release of the decennial census data from 2010 for the purpose of analyzing the suitability of data processed through the DAS.

The DAS is a new approach to privacy in decennial data releases. Releases from 1990 to 2010 relied on "swapping" for disclosure limitation (*29*). Swapping is the process of switching data entries in a controlled way to provide some protection to those with "rare and unique responses" (*30*).

Below, we briefly summarize the most recently released version of the DAS algorithm, which combines differentially private noise injection with postprocessing. We then document the nature of the discrepancies induced by these demonstration data when compared to the original release of 2010 Census data. In particular, we find that the DAS artificially shifts populations from racially mixed areas to homogeneous areas. In the subsequent section, we use redistricting simulation analysis to show how these population discrepancies are likely to affect redistricting plans.

The U.S. Census DAS

The first step of the DAS pipeline is to add independent, symmetric Laplace or geometric noise to counts in each of numerous published Census tables. The differential privacy provides a specific definition of privacy: a probabilistic guarantee that empirical conclusions are relatively unaffected by the inclusion or exclusion of a particular individual from the dataset (*31*). In the case of noise injection as in the DAS, the amount of noise in each file is controlled by the privacy loss budget, denoted by ϵ. Higher values of ϵ exponentially increase the tolerance of what is an acceptable degree of disclosure probability. Formally, differential privacy caps at $\exp(\epsilon)$ the ratio between the likelihoods of a certain output in a pair of datasets that only vary in the inclusion of a single individual. Thus, the additional certainty (in terms of odds) that someone can gain about a particular conclusion will change by at most a factor of $\exp(\epsilon)$ if an individual is included in the dataset. We note that, because census takers will attempt to enumerate every individual in the country regardless of voluntary participation, it is debatable whether differential privacy is a suitable definition of privacy for census data.

In April 2021, the Bureau implemented DAS-12.2 on the 2010 Census and released it as a demonstration of the version of the DAS that they plan to use in the release of the 2020 decennial census statistical tables. The numbers in the version name represent the privacy loss budget. DAS-12.2 represents a relatively high privacy loss budget [$\epsilon = 12.2$, with $\exp(12.2) \approx 2.0 \times 10^5$] to achieve the accuracy targets at the expense of greater privacy loss, whereas an earlier version, DAS-4.5, used a lower privacy loss budget at the expense of worse accuracy [$\epsilon = 4.5$, with $\exp(4.5) \approx 9.0 \times 10^1$]. Both of these privacy loss budgets are high (that is, enforce less stringent privacy guarantees and retain higher accuracy) relative to standard reference points (*32*). There may not be an overlap between the values of ϵ that are considered stringent enough for privacy purposes and high enough for redistricting purposes.

In addition, the Census Bureau postprocesses the noisy tabulation data to ensure that the resulting public release data meet a handful of criteria. First, they must be self-consistent such that, for example, the total population for each block nested within a tract adds up to

the tract population. In addition, they must abide by several common sense constraints, including the avoidance of negative counts. Last, certain aggregate statistics such as state-level total population counts must exactly equal the Census Bureau's best estimate. Counts that remain fixed are considered invariant counts in the Census Bureau's terms. This postprocessing works by using an optimizing routine to find a set of integer counts that meet all the constraints and are as close as possible to the noise-infused data. However, the exact specifics of this optimizing routine are not currently public.

The aggregate geographic levels for which the Census officially accounts, such as states, counties, and tracts, are called on-spine geographies, while off-spine geographies include precincts and voting districts (VTDs). The DAS postprocessing is targeted for accuracy and consistency of on-spine geographies. Notably, to increase accuracy on off-spine units, the Census Bureau has defined special block groups that do not directly correspond to the block groups in the final data release.

The Census Bureau has not released demonstration data that only contain added noise (the first step) before postprocessing (the second step). Without these noisy tabulation data, it is impossible to cleanly separate the effects of postprocessing from those of noise injection. Nonetheless, the existence of the 2010 demonstration data alongside the released 2010 Census allows us to analyze the suitability of the totality of the demonstration data for redistricting purposes.

Last, a complete theoretical investigation of the DAS remains difficult partly because of its complex postprocessing procedure and is beyond the scope of this article. Cohen *et al.* (*28*) examine a previous version of the TopDown algorithm and present some theoretical analysis of its simplified version, which they call "ToyDown." Our empirical investigation complements their theoretical study and shows how the most up-to-date DAS affects redistricting in practice.

Table 1. States and districts studied. We compared the Census 2010, DAS-12.2, and DAS-4.5 datasets in seven states and three levels of elections. Simulations indicate the number of simulations for each of those three different comparison datasets. States that we only use for precinct-level modeling and not for redistricting simulations are denoted by a dashed entry.

State	Office	Districts	Precincts	Simulations
Alabama	–	–	1992	–
Delaware	State Senate	21	434	10,000
Louisiana	State Senate	39	3668	35,000
Louisiana*	State House	15	361	90,000
Mississippi	State Senate	52	1969	50,000
New York†	School Board	9	1207	10,000
North Carolina	U.S. House	13	2692	200,000
Pennsylvania	U.S. House	18	9256	10,000
South Carolina	U.S. House	7	2122	200,000
South Carolina	State House	124	2122	100,000
Utah	–	–	2337	–
Washington	–	–	7312	–

*Examines the Baton Rouge area. †Examines the East Ramapo school district, using Census blocks instead of voting precincts.

Racial and partisan undercounting biases

To evaluate the impact of the new DAS on redistricting plan drawing and analysis, we generated 10 sets of redistricting datasets, described in Table 1. These cases cover federal, state, and local offices across a diverse set of states. Using R packages "geomander" and "ppmf" (*33*, *34*), we create precinct-level datasets that have three versions of total population counts: the original 2010 Census, the DAS-12.2 data, and the DAS-4.5 data.

We first examine the nature of the population variation induced by differential privacy and postprocessing at the level of VTDs. Almost by definition of differential privacy, there is meaningful variation in how VTDs' populations change as a result of the DAS, even among those with similar racial and partisan characteristics. As a result, it is difficult to discern systematic patterns by observation alone. We therefore fit a generalized additive model (GAM) to the precinct-level population errors using various characteristics of the precinct. This model decomposes the overall changes into a systematic component, which varies according to the racial and partisan composition of a precinct, and a residual noise component, which has a mean of zero conditional on the local demographic composition. While the residual noise may lead to concentrated harms in certain small geographic communities, once aggregated to larger geographic areas, it will tend to cancel out. The systematic component, however, will not necessarily cancel, and hence, it is of particular interest to identify and quantify any such systematic error.

Our predictors for the GAM include the two-party Democratic vote share of elections in the precinct, turnout as a fraction of the voting age population, log population density, the fraction of the population that is White, and the Herfindahl-Hirschman index of race as a measure of racial heterogeneity (*35*). The GAM regresses the difference in precinct population between the DAS-12.2 and the Census data on the following function of these predictors

$$P_{\mathrm{DAS},i} - P_{\mathrm{Census},i} = t(\mathrm{Democratic}_i, \mathrm{Turnout}_i, \log(\mathrm{Density}_i)) + s(\mathrm{White}_i) + s(\mathrm{HHI}_i) + \varepsilon_i$$

where i indexes precincts or VTDs, $P_{D,i}$ denotes i's population as reported by data source D, and HHI denotes the Herfindahl-Hirschman index, which is a measure of diversity ranging from 0 (most diverse) to 1 (least diverse). The function t indicates the smoothed tensor product cubic regression, while the function s denotes thin-plate regression splines. Last, ε_i represents the error term. The model explains about 9 to 12% of the overall variance in population change.

Figure 1 plots the fitted values from this model using deviations of the DAS-12.2 data against the minority fraction of the population in each precinct for eight states. We chose to study a variety of states including those frequently studied in redistricting (Pennsylvania and North Carolina), the Deep South (South Carolina, Louisiana, and Alabama), small states (Delaware), and heavily Republican (Utah) or Democratic (Washington) western states. Consistent patterns emerge across these diverse states. As indicated by U-shaped patterns, mixed White/non-White precincts lose the most population relative to more homogeneous precincts. Figure 2 more clearly shows this pattern with racially homogeneous precincts (see fig. S3.3 for the results based on DAS-4.5). We plot the error against the Herfindahl-Hirschman index and find that the fitted error in estimated population steeply declines as the precinct becomes more racially diverse.

These patterns can be partially explained by the adopted DAS targets, which prioritize accuracy for the largest racial group in a

given area (*36*). By doing so, the DAS procedure appears to undercount heterogeneous areas where the population is most racially diverse. In highly heterogeneous precincts, the largest racial group is smaller, so the magnitude of the accuracy guarantees is much smaller. As precincts are the building blocks of political districts, our results demonstrate that precincts that are heterogeneous along racial and partisan lines would see their electoral power diluted under the DAS. In aggregate, the reallocation of population from heterogeneous to homogeneous precincts would tend to increase the apparent spatial segregation by race.

We find a similar pattern of undercounting bias along a partisan dimension, which is detailed in section S3. The Census Bureau does not tabulate partisan data, so this must be a result of the relationship between party and race. To compute election results, we use precinct-level data from statewide elections (to avoid uncontested races and differences idiosyncratic to candidates) sourced from the Voting and Election Science Team (*37*). In Pennsylvania, we use the two-party vote share averaged across all statewide and presidential races, 2004–2008, and adjust to match 2008 turnout levels. In North Carolina, we use the 2012 gubernatorial election at the precinct level. In South Carolina, we use the 2018 gubernatorial election, while in Louisiana, we use the 2019 Secretary of State election, each estimated at the voting tabulation district level, allocated on the basis of the 2010 Census block voting age population. Last, in Delaware, we use the precinct-level returns from the 2020 presidential election.

Moderately Democratic precincts are, on average, assigned less population under the DAS than the actual 2010 Census. Furthermore, higher-turnout precincts are, on average, assigned more population under the DAS than they should otherwise have. These effects are on the order of 5 to 15 voters per precinct, on average, although some are larger. The corresponding effects for the DAS-4.5 data display an identical pattern but with roughly double the magnitude of fitted error (fig. S3.4).

Aggregated across the hundreds of precincts that comprise the average district, the DAS-12.2 errors may become substantial, as we discuss in more detail in the sections below. In the 70 congressional districts in the states that we examine statewide, the average district's population changes by 308 people when measured with DAS-12.2 counts. However, in two Pennsylvania congressional districts in the Philadelphia area, the population changes by 2151 people on

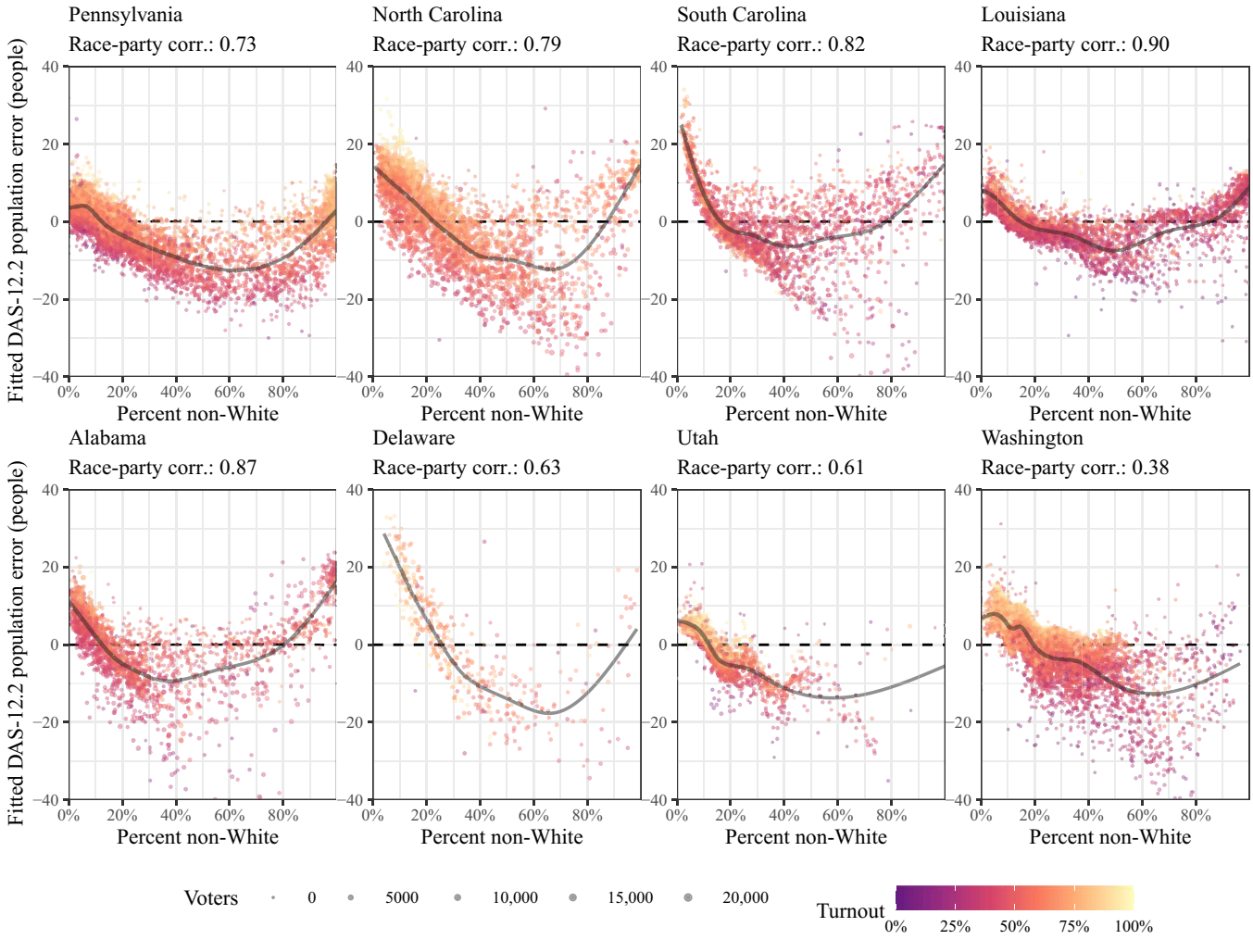

Fig. 1. Model-smoothed error in precinct populations by the minority fraction of voters, with color indicating turnout. A GAM-smoothed curve is overlaid to show the mean error by minority share.

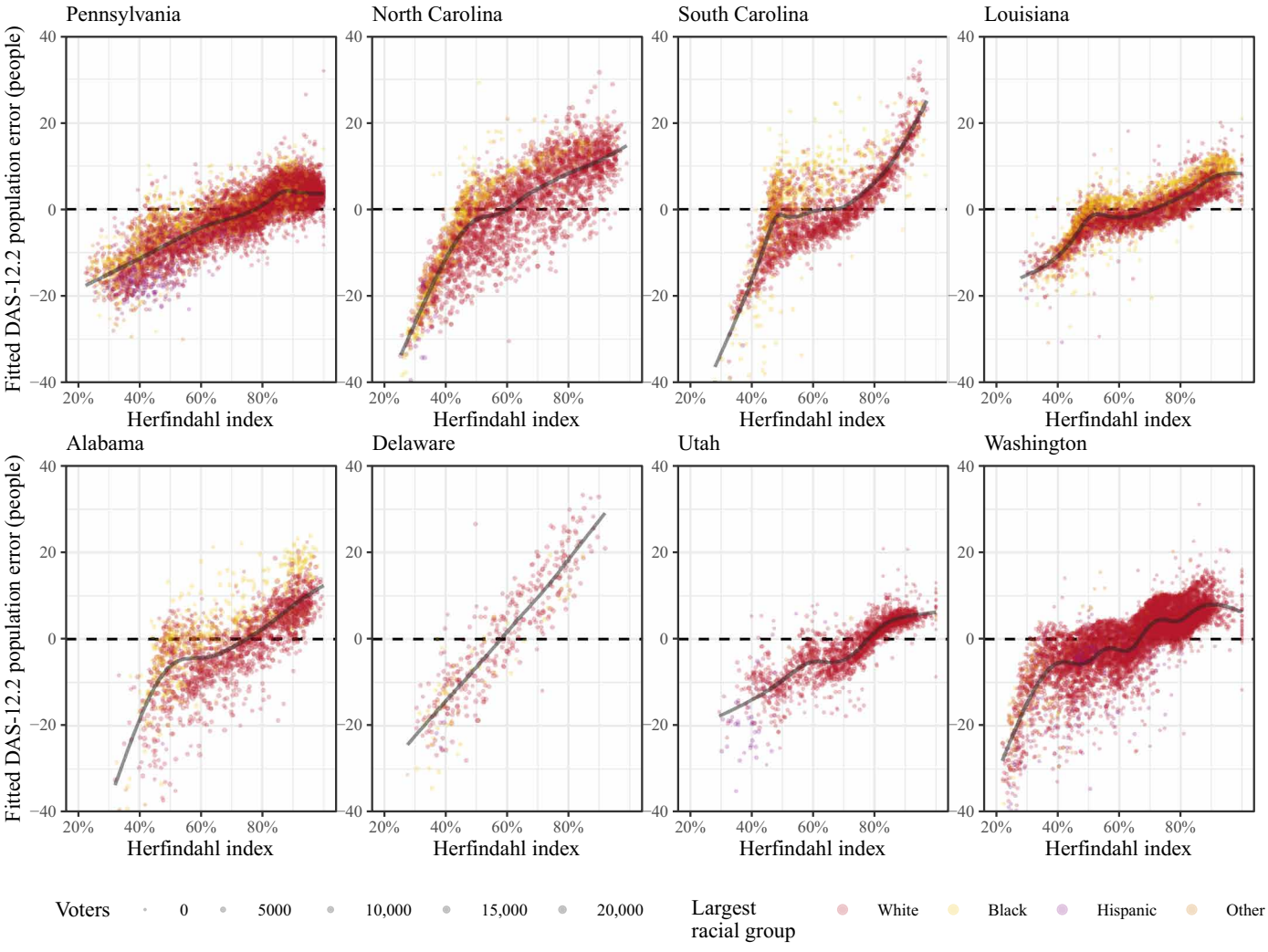

Fig. 2. Model-smoothed error in precinct populations by the Herfindahl-Hirschman index. A Herfindahl-Hirschman index of 100% indicates that the precinct is composed of only one racial group.

average. This measured difference under the DAS is orders of magnitude larger than the difference under block population numbers released in 2010.

It is difficult to know exactly how these partisan and racial biases arise without knowing more detail about the DAS postprocessing system and parameters. Regardless, the presence of differential bias in the precinct populations according to partisanship, turnout, and racial diversity can have important implications.

Simulation analysis

Simulating realistic districts allows us to understand how the DAS would affect a variety of potential redistricting plans beyond the enacted 2010 districts. These analyses are particularly relevant because map drawers will soon be using DAS-processed data to create new districts for the 2020 cycle. The DAS-12.2 data yield precinct population counts that are roughly 1.0% different from the original Census, and the DAS-4.5 data are about 1.9% different. For the average precinct, this amounts to a discrepancy of 18 people (for DAS-12.2) or 33 people (for DAS-4.5) moving across precinct boundaries. Therefore, our main simulation results should be considered as a study of how such precinct-level differences propagate at the district level by exploring many realistic redistricting plans.

Of the 10 states in Table 1, we further analyze 7 for simulation. In our modal analysis, we simulate district plans under the scenario that map drawers only have access to one of the three versions of population counts (the original 2010 Census, the DAS-12.2, or the DAS-4.5). Congressional district simulations were conducted with the sequential Monte Carlo (SMC) redistricting sampler of (*23*), while most of the state legislative district simulations use a merge-split Markov chain Monte Carlo (MCMC) sampler building from (*19*, *20*). Both of these sampling algorithms are implemented in the open-source software package "redist" (*24*). The package allows simulating districts while imposing a population parity constraint so that all simulated maps are realistic (for more detail, see Materials and Methods).

Mirroring enacted maps, congressional district maps were sampled so that population deviations were at most 0.1 to 1%, and state legislative district population deviations were at most 5 to 10%, depending on the state. We generated Monte Carlo samples until the standard diagnostics including the number of effective samples

indicated accurate sampling and adequate sample diversity. In the state legislative district simulations in South Carolina with more than 100 districts and Mississippi with 52 districts, ensuring sampling diversity required running several chains of the merge-split algorithm in parallel, initiated from a sample generated from (*23*).

Impacts on population parity

Perhaps the strongest constraint on modern redistricting is the requirement that districts be nearly equal in population. Deviations in population between districts have the effect of diluting the power of voters in larger-population districts. The importance of this principle stems from a series of Supreme Court cases in the 1960s, beginning with *Gray* v. *Sanders* (1963), in which the court held that political equality comes via a standard known as One Person, One Vote. As for acceptable deviations from population equality, *Wesberry* v. *Sanders* (1964) set the basic terms by holding that the Constitution requires that "as nearly as is practicable one [person's] vote in a congressional election is to be worth as much as another's." Even minute differences in population parity across congressional districts must be justified, including those smaller than the expected error in decennial census figures (*Karcher* v. *Daggett* 1983).

For congressional districts, the majority of states thus balance population to within one person of perfect population parity (*38*). For state legislative districts, *Reynolds* v. *Sims* (1964) held that they must be drawn to near population equality. However, subsequent rulings stated that states may allow for small population deviations when seeking other legitimate interests (*Mahan* v. *Howell* 1972; *Gaffney* v. *Cummings* 1973). It remains to be seen whether the Supreme Court will see deviations due to Census privacy protection as legitimate.

When measuring population equality, states must rely on Census data, which was viewed as the most reliable source of population figures (*Kirkpatrick* v. *Preisler* 1969). We therefore empirically examine how the DAS affects the ability to draw redistricting maps that adhere to this equal population principle. We simulate maps for Pennsylvania congressional districts and Louisiana State Senate districts constrained at various levels of population parity, where populations are defined by one of the three data sources. We then examine the degree to which the resulting maps satisfy the same population parity criteria using another data source.

Deviation from population parity across n_d districts is generally defined as

$$\text{Deviation from parity} = \max_{1 \le k \le n_d} \frac{|P_k - \overline{P}|}{\overline{P}}$$

where P_k denotes the population of district k and $\overline{P}$ denotes the target district population. In other words, we track the percent difference in the district population P_k from the average district size $\overline{P}$ and report the maximum deviation. Our redistricting simulations generate plans that do not exceed a user-specified deviation. After generating these plans, we then reevaluate the deviation from parity using the precinct populations from the three data sources.

We find that the noise introduced by the DAS prevents the drawing of equal-population maps with commonly used population deviation thresholds. Because only one dataset will be available in practice, redistricting practitioners who attempt to create equal-population districts with DAS data should expect the actual deviation from parity to be orders of magnitude larger than what they can observe in the data. Because of the asymmetric postprocessing within the DAS algorithm, there is no clear way to improve estimates or to be confident in the magnitude of the error for any particular case. Below, we conduct simulations on congressional and state legislative districts. We find that this problem is more acute in state legislative districts, where there are more districts and each district is composed of fewer precincts. This is likely a consequence of the DAS procedure, for which noise is relatively larger at smaller scales.

Congressional districts in Pennsylvania. First, we analyze how the parity of the 2010 enacted Pennsylvania congressional districts varies when measured with each dataset. Congressional districts are generally drawn as to be nearly equal as possible. The enacted Pennsylvania congressional map has a maximum population difference between districts of 283 people (or 0.04%). When measured under the DAS, however, these differences are considerably larger, at 3893 people for DAS-4.5 (0.57%) and 2287 for DAS-12.2 (0.32%).

Investigating a singular enacted plan only allows us to measure how DAS influences parity in one particular instance. However, simulations allow us to generate many potential maps and investigate how likely parity errors would be under various intended tolerances. Figure 3 shows the maximum deviation from population parity for the 30,000 simulated redistricting plans in Pennsylvania, when evaluated according to the three different data sources. We simulated 10,000 plans from each data source, with every plan satisfying a 0.1% population parity constraint. The simulation algorithm also ensured that no more than 17 counties were split across the entire state, reflecting the requirement in Pennsylvania that district boundaries align with the boundaries of political subdivisions to the greatest extent possible.

Consistently, plans that were generated under one set of population data and drawn to have a maximum deviation of no more than 0.1% had much larger deviations when measured under a different set of population data. For example, of the 10,000 maps simulated using the DAS-12.2 data (the middle panel of the figure), 9915 exceeded the maximum population deviation threshold, according to the 2010 Census data. While nearly every plan failed to meet the population deviation threshold, the exact amount of error varied greatly across the simulation set. As a result, redistricting practitioners who attempt to create equal-population districts according to similar thresholds can expect the actual deviation from parity to be larger than reported but of unknown magnitude.

State legislative districts in Louisiana. We expect smaller districts such as state legislative districts to be more prone to discrepancies in population parity. For example, the average Louisiana congressional district comprises about 600 precincts, but a State Senate district comprises about 90 and a State House district comprises only 35. Therefore, deviations due to DAS are more likely to result in larger percent deviations from the average.

First, we calculate how the DAS influences the parity of the enacted map. Louisiana's state constitution places no legal parity requirements beyond that districts be created "as equally as practicable on the basis of population shown by the census." However, their adopted guidelines for the 2010 redistricting cycle set 5% as a target for all maps drawn for the State House (*39*). The State Senate map, with a parity of 4.97%, appears to have been drawn to target this goal as well. However, we find that both enacted plans under the DAS have population parities of above 5%, rendering the enacted plan invalid under the state's own guidelines.

Second, we use simulations to examine whether this pattern is also found in other realistic maps. We compare 30,000 Louisiana State Senate plans generated from each of the three data sources

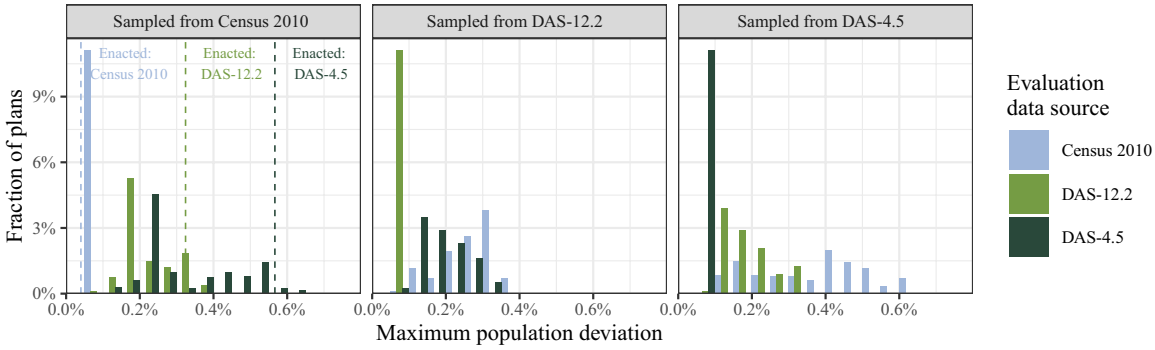

Fig. 3. Maximum deviation from population parity among Pennsylvania redistricting plans simulated from the three data sources. All plans were sampled with a population constraint of 0.1%, corresponding to the deviation measured from the Census 2010 precinct data and marked with the dashed line. Deviation from parity was then evaluated using the three versions of population data.

(90,000 in total) and population parity constraints ranging from 0.1 to 30%, measuring the plans' population deviation against the three different data sources. We simulated 5000 plans for each data source/population parity pair. Figure 4 plots the results of this comparison.

As expected, we see complete acceptance for plans measured with the dataset from which they were generated. However, plans generated under one dataset can exceed the population threshold under another. Specifically, plans generated under DAS data can be highly likely to be invalid when evaluated using the true Census data. The rate of invalid plans grows as the tolerance becomes more precise.

Also note that even at tolerances as generous as 1 or 5%, plans generated from both versions of DAS data can regularly be invalid. Compared to Pennsylvania congressional districts, with a parity tolerance of 0.1%, simulated districts for the Louisiana State Senate fail to meet the cutoffs much more often, as the DAS-added noise is relatively larger at smaller scales. This suggests that map drawers using the DAS-adjusted demonstration data should anticipate actual population differences between districts to be larger than reported, although they will not be able to know the true magnitude of the errors.

Impacts on partisan composition

If changes in reported population in precincts affect the districts in which they are assigned to, then this has implications for which parties win those districts. While a change in population counts of about 1% may seem small, differences in vote counts of that magnitude can reverse some election outcomes. Across the five U.S. House election cycles between 2012 and 2020, 25 races were decided by a margin of less than a percentage point between the Republican and Democratic party's vote shares, and 228 state legislative races were decided by less than a percentage point between 2012 and 2016.

Partisan implications also raise the concern of gerrymandering, where political parties draw district boundaries to systematically favor their own voters. Simulation methods have been regularly used in redistricting litigation over partisan gerrymanders, including *Common Cause* v. *Lewis*, *Rucho* v. *Common Cause*, *Ohio A. Philip Randolph Institute* v. *Householder*, *League of Women Voters of Michigan* v. *Benson*, and *League of Women Voters* v. *Pennsylvania*. To evaluate the impact of the DAS on the analysis of potential partisan gerrymanders, we used the simulations from four states (Table 1) and compared the partisan attributes of the simulated plans from the three data sources.

How does the systematic undercounting and overcounting of precinct-level populations in the DAS data affect the conclusions that we draw about the partisan and racial biases of legislative redistricting plans? We first assess the impact of DAS data in identifying partisan packing and cracking, following a common approach in redistricting analysis. Practitioners and researchers compare enacted plans against a distribution of election results from each simulated plan, for example, adding up each precinct-level vote tabulation to each simulated district. Plans that are partisan gerrymanders stand out from the simulated ensemble as yielding more seats for one party over the other. The argument that ensemble analysis is sufficient for this purpose has been made in various academic contexts, including (*40*, *41*), and litigation contexts, most recently (*42*, *43*).

The results from nonsimulation analysis (figs. S1 and S2) suggest that the DAS-induced noise may not cancel out if diverse areas are spatially clustered. The systematic patterns at the district level clearly depend on the spatial adjacency of diverse and homogeneous precincts. Simulations can evaluate these implications beyond particular enacted plans.

We find that across tens of thousands of simulated plans, the DAS leads to unpredictable differences in the distribution state-level party outcomes under the three data sources. Figure 5 summarizes the differences in simulations with the aforementioned ensemble approach. To compare district-level partisan outcomes across simulations, we sort districts in ascending order of the Democratic candidate's vote share in each simulation so that district number 1 in North Carolina is always the most Republican district in each simulated plan and district number 13 is the most Democratic district in the same plan. For each ordered district in each simulation, we subtract off the enacted plan's Democratic vote share and plot the differences in a box plot (whiskers extend the entire range of simulated data). A box plot completely above zero indicates that the enacted plan had fewer Democratic voters in that district than would be expected under a partisan-neutral baseline, in other words, that the district cracked Democratic voters.

Figure 5 shows that while in some cases, such as the congressional districts in North and South Carolina, there are no discernible differences across the three data sources, for others, the differences can be substantial. For the South Carolina State House, a pattern of cracking in the 61st to 75th most Democratic districts under the Census 2010 data disappears under the DAS-protected data. Moreover, evidence of packing in the 111th to 115th most Democratic state legislative districts under the Census 2010 data is reversed under the DAS-4.5 data. In Pennsylvania, results are relatively stable across data

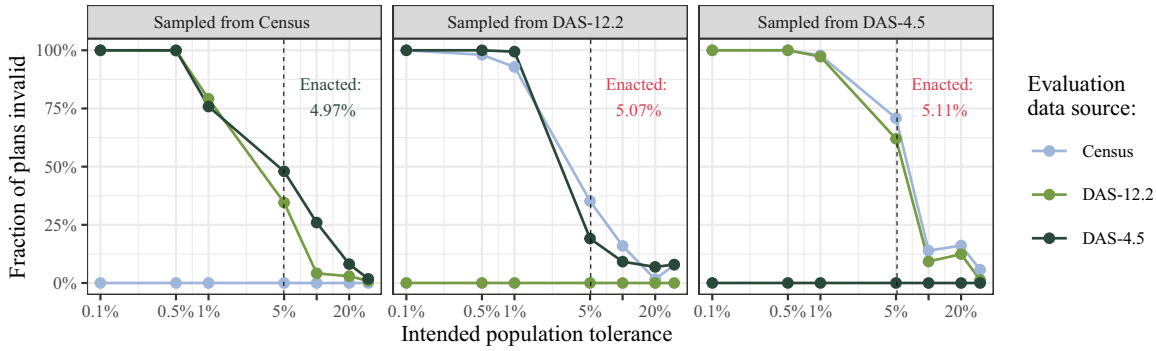

Fig. 4. Fraction of Louisiana State Senate plans simulated under one data source with a population parity constraint that is invalid when measured under another. The horizontal axis shows the tolerance constraint for the original simulation on the $\log_{10}$ scale. The vertical axis shows the percent of plans that exceed the intended tolerance according to the evaluation data. The dashed lines show the maximum deviation from parity of the enacted 2010 State Senate map as measured under each dataset. The enacted plan meets the 5% target when measured with the Census, but parity exceeds 5% in both DAS datasets.

sources for the relatively Republican districts 1 to 14 but display considerable differences for the most Democratic districts (15 and 17), with median discrepancies moving as much as five percentage points.

Given that redistricting litigation often must focus on a single district or set of districts (*44*), discrepancies of this magnitude at the district level could change the conclusions regarding the presence or absence of a partisan gerrymander. The fact that the presence and magnitude of the discrepancies are not consistent even within the same state can complicate efforts to take into account these potential biases in research and decision-making.

Impacts on racial composition

The Voting Rights Act of 1965, its subsequent amendments, and a series of Supreme Court cases all center race as an important feature of redistricting. A large number of these cases focus on the creation of MMDs (e.g., *Thornburg* v. *Gingles* 1986, *Shaw* v. *Reno* 1993, *Miller* v. *Johnson* 1995, and *Shelby County* v. *Holder* 2013). First, we analyze whether the DAS data systematically undercount or overcount certain areas across racial lines. In doing so, we focus on the consequences of the Bureau's decision to target accuracy to the majority racial group in a given area in their postprocessing procedure (*36*).

We also explore how DAS data can influence the creation of MMDs. To do so, we empirically examine how using the DAS data to create MMDs differs from the same process undertaken using the 2010 Census data. We simulate maps in the Louisiana State House using various levels of a constraint targeted to create MMDs and examine the degree to which maps generated using the Census and DAS data lead to different results at the precinct level.

Figure 6 compares the simulations drawn from the three data sources in a way similar to Fig. 5 but by ordering the districts by their Black population share instead of Democratic vote share. As in Fig. 5, there are inconsistent patterns across states and district sizes. The racial makeup of congressional districts in North and South Carolina does not appear to be affected. For the South Carolina State House, patterns of cracking in the districts with the largest racial minorities (districts ordered 121 to 124) under the Census 2010 data disappear or are even reversed under the DAS-12.2 and DAS-4.5 data. In districts ranked to be the 96th to 110th most Black, patterns of packing are reversed in the DAS data. Similarly, in the Mississippi State Senate, evidence of cracking in the most Black districts (ordered 49 to 52) becomes evidence of packing under the DAS-12.2 data. In Pennsylvania's 18 congressional districts, patterns are generally stable across the data sources for the 14 most White congressional districts but display considerable differences for the heavily non-White districts ordered 16 and 17, with median discrepancies moving as much as seven percentage points.

These district-level findings may still mask the variability around which individual precincts are included in MMDs. To explore this, we run simulations using several levels of a Voting Rights Act constraint, which we did not apply in previous sections, to encourage the formation of MMDs at various strengths. We focus on Louisiana State House districts in the Baton Rouge area and run 10,000 simulations of the merge-split MCMC sampler for each dataset-constraint pair. We then calculate the probability that each precinct is assigned to an MMD (as defined by Black population) by the proportion of Monte Carlo samples in which the precinct is assigned to an MMD.

The left and right columns of Fig. 7 show the difference between these probabilities for the Census versus DAS-12.2 and Census versus DAS-4.5. With no Voting Rights Act constraint (corresponding to the Voting Rights Act strength of zero on the y axis), each precinct has similar probabilities of being in an MMD, regardless of the dataset used. However, as the strength of this constraint increases (making the algorithm search for MMDs more aggressively), we see that the noise introduced to the DAS data systematically alters the district membership of individual precincts. Precincts with a value of 1 or −1 in Fig. 7 are never in an MMD under one data source but are always in an MMD when the same mapmaking process is undertaken with a different data source.

This means that how the Census implements the DAS could influence the political representation of voters in particular precincts. The simulation methods used are probabilistic, and assignment differences are expected and even desired between many created districts. However, these results illustrate a potential scenario in which real map drawers decide to add or remove precincts from a particular district to keep minority groups together because of population deviation introduced by DAS.

Impacts on ecological inference and voting rights analysis

Researchers have developed methods to predict the race and ethnicity of individual voters using Census data. Since *Gingles*, voting rights cases have required evidence that an individual's race is highly correlated with candidate choice. Statistical methods must therefore estimate this individual quantity from aggregate election results

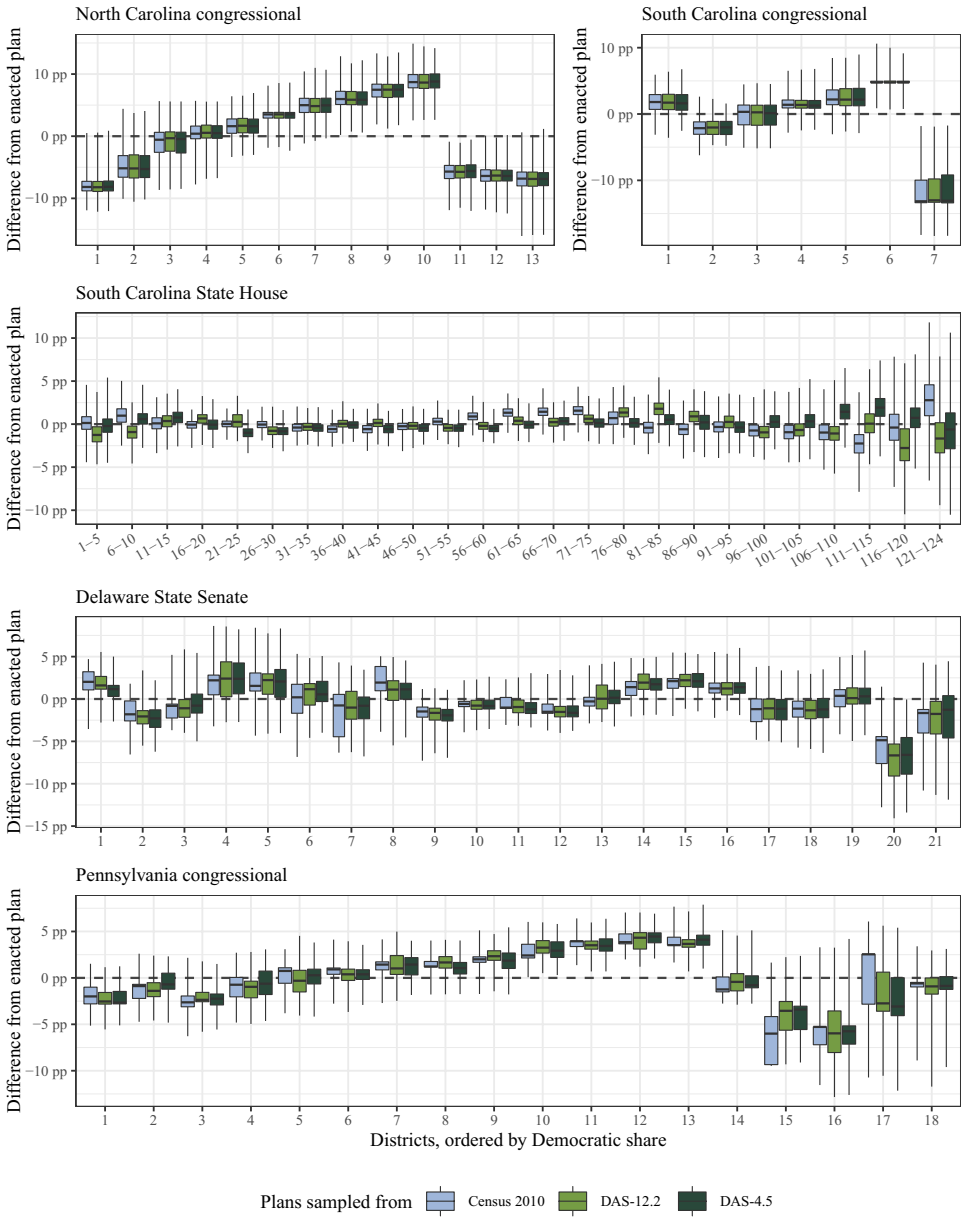

Fig. 5. The distribution of the simulated Democratic vote share relative to the enacted redistricting plan in percentage points, comparing the original Census with DAS versions. Districts are ordered by the level of the Democratic vote in each simulation. Districts are grouped for the South Carolina State House because of the large number of districts. Whiskers extend to cover the full range of the simulated data. pp, percentage points.

and aggregate demographic statistics (*45*–*47*). A key input to these methods is accurate racial information on voters. To produce these data, recent litigation has used BISG to impute race and ethnicity into a voter file (*25*–*27*). This methodology provides improved classification of the degree of racially polarized voting and racial segregation.

We first examine how the accuracy of prediction changes between the DAS and original Census data. While differential privacy should not prevent statistical prediction, race is the most sensitive information included in the P.L. 94-171 data release. Hence, it is of interest to examine whether the DAS will degrade the prediction accuracy of individual race and ethnicity. We follow up on this analysis by revisiting a recent Voting Rights Act Section 2 court case about the East Ramapo school board election and investigate whether this change in racial prediction alters the conclusions of the racial redistricting analysis.

Prediction of individual voters' race and ethnicity. We first compare the accuracy of predicting individual voters' race and ethnicity using the original 2010 Census data, the DAS-12.2 data, and the DAS-4.5 data. To obtain the benchmark, we use the North Carolina voter file acquired in February 2021. All voter files used here were obtained through L2 Inc., a leading national nonpartisan firm that supplies voter data and related technology. In the United States, voter files are particularly widespread because

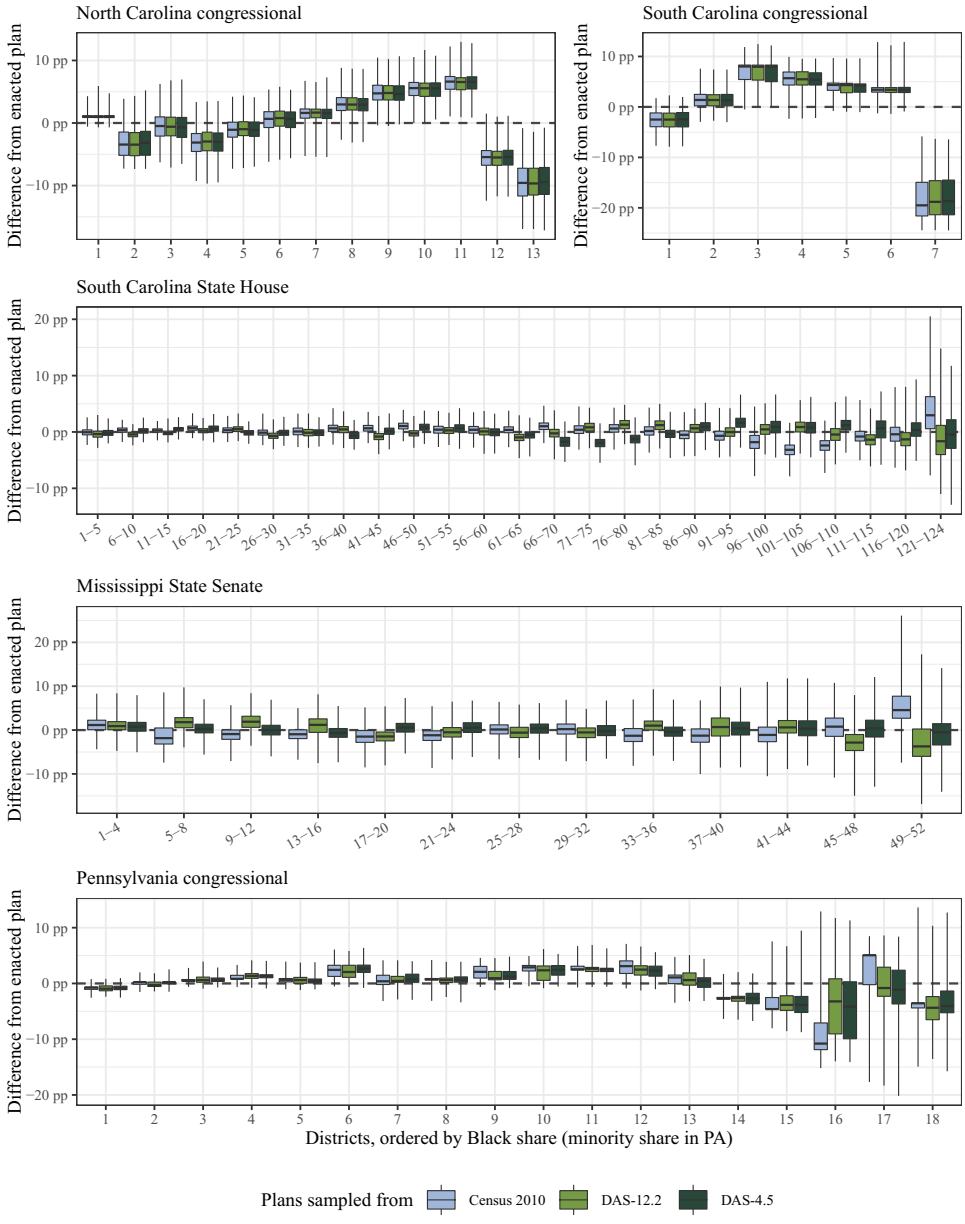

Fig. 6. The distribution of the simulated Black population share relative to the enacted redistricting plan in percentage points, comparing the original Census with DAS versions. Districts are numbered in ascending order of the Black or minority population share in each simulation. Districts are grouped for the South Carolina State House and Mississippi State Senate because of the large number of districts. Whiskers extend to cover the full range of the data.

of the Help America Vote Act of 2002. In several southern states—Alabama, Florida, Georgia, Louisiana, North Carolina, and South Carolina—the voter files contain the self-reported race of each registered voter. This information can then be used to assess the accuracy of the BISG prediction methodology (see Materials and Methods).

We compare estimates by changing the data source from which the geographic prior is estimated, from the 2010 Census to each of the two DAS datasets. Estimates of the other race prediction probabilities are obtained by merging three sources: the 2010 Census surname list (*48*), the Spanish surname list from the Census, and the voter files from six states in the U.S. South, where state governments collect racial and ethnic data about registered voters for Voting Rights Act compliance. The middle and first name probabilities are derived exclusively from the voter files.

We evaluate the accuracy of the BISG methodology on approximately 5.8 million registered voters included in the North Carolina February 2021 voter file. Among them, approximately 70% are White and 22.5% are Black, with smaller contingents of Hispanic (3.4%), Asian (1.5%), and other (2.4%) voters.

Figure 8 summarizes the accuracy of the race prediction with the area under the receiver operating characteristic curve (AUROC), which ranges from 0 (perfect misclassification) to 1 (perfect classification). Across all racial and ethnic groups except Hispanics, we find the same unexpected pattern. Relative to the 2010 Census data,

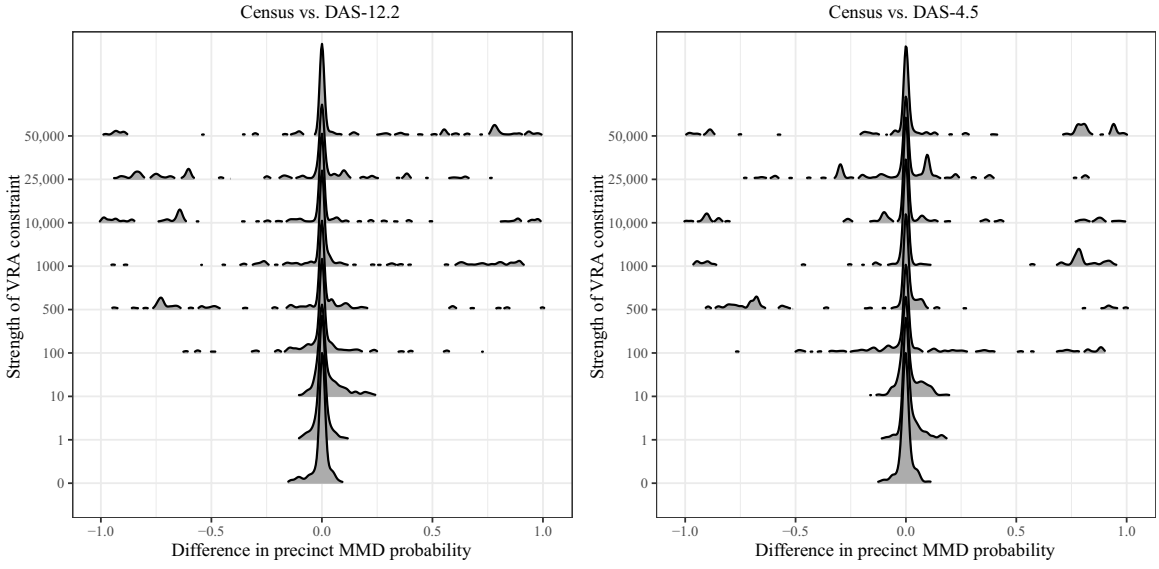

Fig. 7. The difference in calculated probabilities of being assigned to an MMD under the DAS compared to the original Census. VRA, Voting Rights Act. Strength of VRA constraint is a weight that controls the preference for MMDs in the simulation's target distribution (see Materials and Methods, Eq. 1).

the DAS-12.2 data yield a small improvement in prediction performance, while the DAS-4.5 data give a slight degradation. Among Hispanics, both forms of DAS-protected data result in slightly improved predictions over the original Census data.

The strong performance of the DAS data in this setting is counterintuitive. It is possible that the noise added to the underlying data has somehow mirrored the true patterns of population shift from 2010 to 2021 or that this noise makes the DAS-12.2 data more reflective of the registered voter population relative to the total population. In addition, the DAS may degrade or attenuate individual probabilities without having a meaningful impact on the overall ability to classify, something that AUROC is not designed to measure (*49*). Despite this, AUROC has been used to measure the disclosure risk from differentially private data in pharmacogenomic research (*50*).

Results are substantively similar if we consider the classification error, under the heuristic that we assign each individual to the racial and ethnic group with the highest posterior probability. Using the true Census data to establish geographic priors, we achieve posterior misclassification rates of 15.1, 12.1, and 10.0% when using the last name; last name and first name; and last, first, and middle names for prediction, respectively. The analogous misclassification rates are slightly higher for the DAS-4.5 priors—15.6, 12.5, and 10.3%—but the same or slightly lower for the DAS-12.2 priors: 15.1, 12.0, and 9.9%.

Our analysis shows that across three main racial and ethnic groups, the predictions based on the DAS data appear to be as accurate as those based on the 2010 Census data. The finding suggests that, although the new DAS methodology may protect differential privacy, it may not prevent accurate prediction of sensitive attributes any more than the swapping methodology used in the 2010 Census.

Implications for evidence in voting rights cases. How might these differences in BISG result affect findings in voting rights cases? We reexamine the remedy in *NAACP of Spring Valley* v. *East Ramapo Central School District* (2020) as a case study. The BISG methodology played a central role in this recent case regarding Section 2 of the Voting Rights Act. The East Ramapo Central School District (ERCSD) nine-member school board was elected using at-large elections. This often led to an all-White school board, despite 35% of the voter-eligible population being Black or Hispanic. However, within the district, nearly all White school children attend private yeshivas, whereas nearly all Black and Hispanic children attend the ERCSD public schools. As a result of the court ruling for the plaintiffs, the district moved to a ward system. That is, the school district adopted a system with seven geography-based election districts.

We reexamine the remedy of this case by focusing on plans with MMDs. We estimate how many MMDs the move to a district system would create in this case, based on imputations of individual race and ethnicity using either the DAS-12.2 or the Census 2010 data. The move from at-large elections to district systems has been shown to improve representation for minority candidates in local elections with high residential segregation, like the ERCSD (*51*).

To approximate the data used by an expert witness who testified in the court case, we obtain the New York voter file (as of 16 November 2020) from the state Board of Elections. We subset the voters to active voters with addresses in Rockland County where the ERCSD is located. Using the R package "censusxy," which interfaces with the Census Bureau's batch geocoder, we match each voter to a block and subset the voters to those who live within the geographic bounds of the ERCSD (*52*). This leaves 58,253 voters, for whom we impute races using the same machinery behind the R package "wru" (*53*), as described in (*27*). This process closely mimics the one used in the original case.

We first examine how BISG results differ at smaller levels, before simulating how these differences manifest in the number of MMDs that can be drawn. Figure 9 compares these two predictions using the proportions of (predicted) White, Black, and Hispanic registered voters for each Census block. As in the case, we aggregate predicted probabilities for each individual's race to the block level rather than classifying each individual by their most likely predicted race. We find that the predictions based on the DAS-12.2 tend to produce blocks with more White registered voters than those based on the original Census data. As a consequence, the predicted proportions of Black and Hispanic registrants are much smaller, especially in the blocks where they form a majority group.

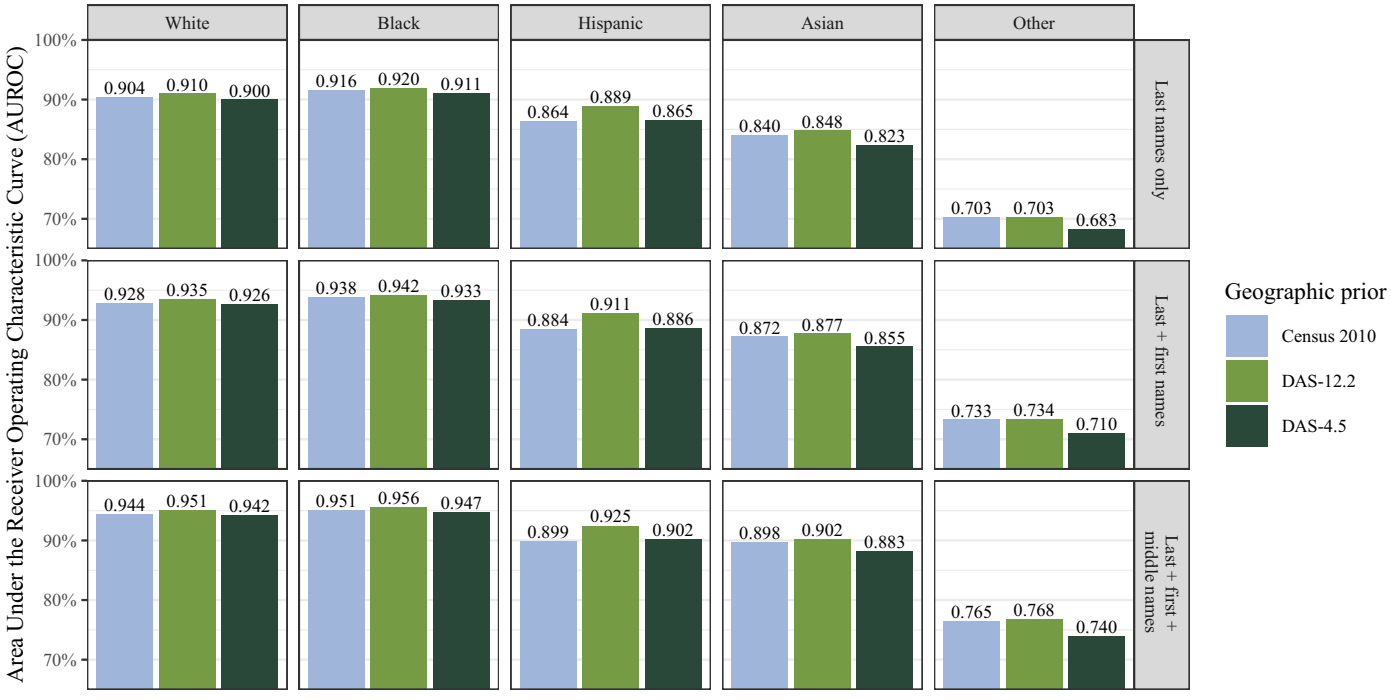

Fig. 8. AUROC percentage values for the prediction of individual voter's race and ethnicity using North Carolina voter file. Bars represent AUROC with geographic priors given by each of three datasets: 2010 Census, DAS-12.2, and DAS-4.5.

The precise reason for these biases is unclear. The DAS tends to introduce more error for minority groups than for White voters and even more error for a racial group that is a minority in its Census block. This additional noise, when carried through a nonlinear transformation such as the Bayes' rule calculation for racial imputation, may introduce some bias. In addition, the large bias for White and Black voters relative to Hispanic voters suggests that the similarity of surnames between the White and Black populations, compared to the Hispanic population, may also be a factor. Regardless, it is clear that the DAS-injected noise differentially biases voter race imputations at the block level. This pattern may not always yield greater inaccuracies when aggregated to the statewide level, as seen in the prior section, but it is especially prevalent within the ERCSD.

We further find that the systematic differences in racial prediction at the block level result in the underestimation of the number of MMDs that can be drawn from the data. We simulate 10,000 redistricting plans using DAS-12.2 population and a 5% population parity tolerance. As in the original court case, an MMD is defined as a district in which more than 50% of its registered voters are either Black or Hispanic. We find that the number of MMDs based on the DAS-12.2 data never exceeds that based on the 2010 Census for all simulated plans. Notably, among 6774 plans that are estimated to yield two MMDs according to the Census data, 56% of them are predicted to have only one MMD. For a complete accounting of simulation evidence in this local case, see table S4.2.

While this single case of local redistricting does not represent the entire universe of local redistricting, our analysis suggests that in small electoral districts, such as those of school board elections, the DAS can generate bias that may favor one racial group over another. Local governments generally do not lie on-spine so they may be especially victim to the random seed used in privatizing the data. Although the number of MMDs is underestimated under the DAS data in this case, the direction and magnitude of racial effects are difficult to predict, as they depend on how the choice of tuning parameters in the DAS algorithm interact with a number of geographical and other factors.

DISCUSSION

Significance

Here, we study how the DAS and subsequent postprocessing steps could affect the process of redistricting. Our analysis shows that the added noise makes it impossible to follow the principle of One Person, One Vote, as it is currently interpreted by courts and policy-makers. The principle requires states to minimize population differences between districts as much as possible. Given the magnitude of population errors introduced by the DAS, our analysis shows that current practices of redistricting will make it difficult and, in some cases, effectively impossible to meet these existing standards relative to the Census' best estimates of total population. In the near future, courts may decide to treat this new type of error as is or loosen the bounds on these standards. Such a move will change the precedents and alter our understanding of redistricting in the United States. It may also affect the partisan balance of power.

The complex nature of the DAS postprocessing procedure masks the original source of these biases. Our findings suggest that they are likely a combination of several factors. First, the bias against heterogeneous areas could be driven by the Bureau's decision to target accuracy to the population count of the majority racial group in a given area (*36*). Second, the choice to not prioritize accuracy at the block level leads to an additive effect in many cases. Our precinct-level population tabulations reveal around a 1% average deviation

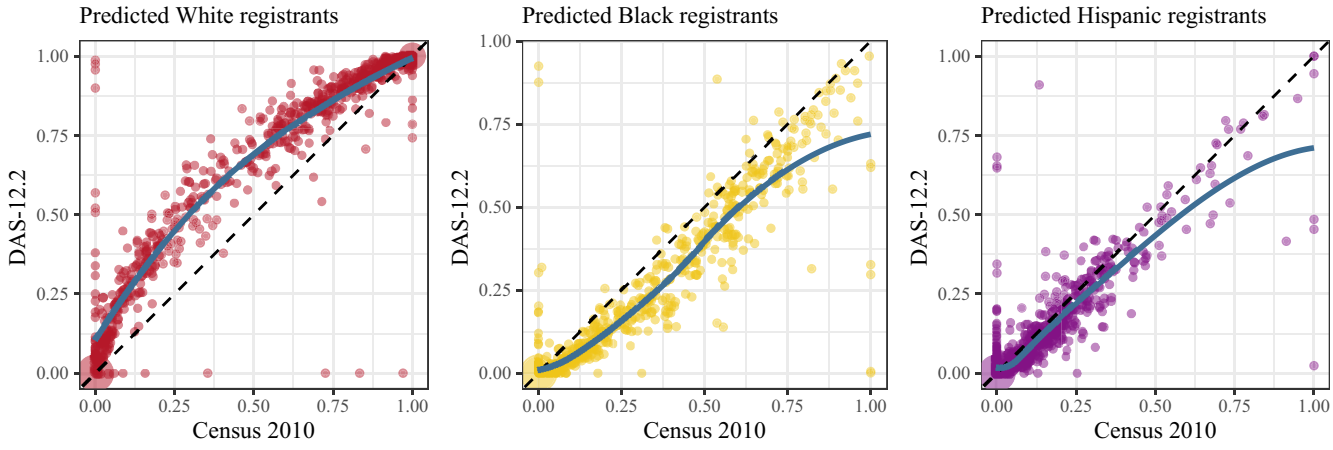

Fig. 9. Differences in imputed racial registrants by census blocks. The *x* axis represents the percent of a group, as measured by aggregating predicted probabilities for race from racial imputation using the Census 2010 data. The *y* axis represents the corresponding imputation using the DAS-12.2 data.

in the DAS-12.2 data compared to the 2010 Census data, and these errors do not always cancel out. Ensuring that population is accurate at this off-spine geography would help minimize population deviations among the majority of states that rely on these geographies to draw and evaluate their districts.

One general strength of the differential privacy framework is that the noise generation mechanism is known. However, the asymmetric and deterministic nature of the postprocessing procedure of the DAS makes a proper statistical adjustment difficult for many commonly used models and nearly impossible for others. For this reason, many analysts are likely to treat the DAS-protected data as the basis for evaluating districts, as they have done with the past versions of the Bureau's disclosure avoidance methods.

One possible approach is for the Bureau to additionally release the noisy DAS data without postprocessing so that analysts can use it for their statistical analysis. This will not solve the problems in map drawing but would allow researchers to properly calibrate uncertainty for at least some analyses when evaluating redistricting maps. However, new methodological developments are needed to properly incorporate the DAS noise generation mechanism into redistricting simulation analyses. In addition, it remains to be seen whether the addition of noise significantly reduces the statistical power to detect racial and partisan gerrymandering in litigation.

Implications

When considering the fundamental trade-off between privacy protection and data accuracy, it is critical to understand what individual data are at risk. The decennial census collects information on individual age, sex, race, relationship to the head of household, and basic housing information but not other, more sensitive information, such as citizenship, income, and disability status. The basic demographic variables in the decennial census play an essential role in public policy, including redistricting, the subject of this article, and the disbursement of federal and state funds. Individuals' race and ethnicity are perhaps the most sensitive variable to be protected in the decennial census microdata.

The ability to reveal the race of 17% of respondents through a microdata reconstruction experiment (using a compendium of five commercial databases) provided key motivation for the Bureau's decision to adopt differential privacy (*54*). Combining the Census data with a publicly available voter file, we find that the prediction of individual race is as accurate with the DAS data as with the original Census data. We expect these findings to be relevant even where public voter files are not available but where the commercial databases as used in (*54*) still are.

Although accurate individual-level prediction does not necessarily constitute a violation of differential privacy, we believe that this finding needs to be considered when weighing the benefits and costs of privacy protection in the decennial census. Our empirical findings on racial imputation accuracy point to the fact that differential privacy does not necessarily prevent accurate prediction of individuals' sensitive information better than the prior privacy protection method.

Based in part on an earlier version of this article, along with input from other researchers and practitioners, the Census Bureau has altered the DAS algorithm to address some of the aforementioned problems. According to the Census Bureau's 9 June 2021 press release, the Bureau now plans to further increase the privacy loss budget and modify the postprocessing algorithm. In addition, its 1 July 2021 newsletter states that this latest change has lowered the total error at areas above the optimized block group but has increased the amount of error introduced by the DAS at the block level. We plan to analyze new demonstration data based on this updated DAS algorithm once released.

It is important to point out that the Census Bureau claimed that the DAS-12.2 analyzed here met all internal accuracy targets "established for redistricting, Voting Rights Act enforcement, and other priority uses of the redistricting data" (*55*). Nonetheless, we are still able to identify systematic biases across several states in that data on precisely the topic for which these accuracy guarantees were designed. If the same flaws are not resolved in the 2020 Census data, then they may have important ramifications for the upcoming redistricting cycle and for years to come.

Many national statistics agencies around the world face the difficult task of balancing the statutory requirements to protect respondent privacy with the accuracy of their reported count. Full enumeration censuses must pay special attention to disclosure risks due to the inclusion of data from every person that can be counted. At the same time, since censuses are used to allocate political power between geographic areas, it is equally important to ensure the accuracy and usability of the reported counts.

The U.S. Census Bureau's DAS clearly reflects this critical trade-off. The DAS relies on differential privacy, adding random noise to the raw Census counts, while it also uses a complex postprocessing procedure to avoid negative counts and maintain consistency of published population counts across several levels of geographical units. This two-step algorithm creates counts that appear to be usable and are consistent within and across tables. This feature makes it likely that a similar algorithm will be used in other contexts. Our findings suggest, however, that the complex and nonlinear nature of the DAS can increase the chances of systematic errors and biases.

This article focused on the impacts of the DAS on redistricting analyses using the latest versions of the demonstration data released before the 2020 Census data are delivered. This offered a framework for evaluation that was completely within the stated use for the data. We considered a likely scenario, in which map drawers and analysts treat the noise-injected DAS data as is, without performing any additional accounting for the DAS noise. We find that the DAS has profound effects on standard redistricting analyses and procedures. Despite the efforts of the Bureau to minimize error, we find that the added noise artificially shifts population counts from racially heterogeneous and mixed-partisanship areas to more homogeneous areas. These nonrandom local errors can aggregate into substantively large and unpredictable biases at district levels, especially for small districts. Fixing these systematic biases is of fundamental importance, as they will have partisan and racial impacts on the upcoming redistricting.

Privacy protection in the decennial census is not free; it comes with the societal cost of decreasing accuracy, which has ripple effects in making and evaluating public policy. Therefore, we must ask what private information we wish to protect and what cost we are willing to pay for it. The burden of privacy should not be borne disproportionately by people of certain races or political preferences.

POSTSCRIPT

On 12 August 2021, about 6 weeks before the planned release, the Census Bureau released the finalized demonstration data for the 2020 Census. The Bureau announced several important changes to the DAS. These changes were based on the comments and feedback submitted during a public comment period in May 2021, where the initial version of this article was also submitted. First, the Bureau announced a greater privacy loss budget ($\epsilon = 19.61$) than for either of the previous releases ($\epsilon = 12.2$ and 4.5). According to the Bureau's presentation on 1 July 2021, they have resolved the problems due to "geographic bias" ("the accuracy of population counts being different at larger and smaller geographies") and "characteristic bias" ("counts of racially or ethnically diverse geographies being different than more racially or ethnically homogeneous areas"). This constitutes a 1000-fold increase (on the probability ratio scale) in the leniency of the privacy guarantee since $\exp(19.61)/\exp(12.2) \approx 1.6 \times 10^3$. Second, the Bureau announced several changes to the postprocessing algorithm with the goal of reducing biases of the type that we demonstrated in our article. Third, according to the Bureau, they modified the postprocessing algorithm to reduce the total error at high levels of geography above the block group. As a side effect, this will likely increase total error at the block level.

In this section, we repeat our analyses above using the DAS-19.61 data. The Census Bureau reports that the DAS-19.61 corrects for racial and partisan biases at on-spine geographical units higher than the block group. Unfortunately, we still observe these biases at the VTD level because the Bureau did not attempt to minimize VTD-level errors as part of their postprocessing. This fact has important implications for redistricting simulation analyses, which are typically based on VTDs. We find that, although the differences in population counts between the DAS-19.61 and 2010 census data are an order of magnitude smaller than before at the congressional district level, strict population parities may still not be attainable in some cases. In addition, racial and partisan effects of the DAS-19.61 data on simulation analyses remain qualitatively similar to those of the prior DAS releases. It appears that the evaluation of redistricting maps based on the DAS-19.61 can sometimes yield conclusions different from that based on the census data. Last, like before, the latest DAS does not degrade the overall prediction accuracy of individual voters' race and ethnicity. However, these predictions are sufficiently different to possibly affect the conclusions of simulation analysis for the voting rights of minority groups.

In summary, the latest release of DAS-protected data improves over previous releases in many ways but fails to address all of the problems identified here, particularly those affecting the drawing and simulation of districting plans. Biases remain at the VTD level even after increasing the total privacy loss budget. These biases would likely not be resolved by any increase in the privacy loss budget. Instead, these biases likely come from the decision to maintain accuracy at geographies other than VTDs and voting precincts, such as census tracts. The imperfect overlap between these boundaries, combined with the increase in errors at small geographic levels such as census blocks, could still affect redistricting analyses. At the same time, using the latest DAS-protected data, we are still able to accurately predict individual's race, which is the most sensitive information of the decennial census.

Racial and partisan biases

Figures S4.1, S4.2, and S4.3 replicate Figs. 1 and 2 and fig. S3.1 on the DAS-19.61 data. For VTDs, we observe the same pattern of bias as before, albeit around half the magnitude, and despite the Bureau's assurances that racial biases had been corrected by changes to the postprocessing system.

However, it does appear to be the case that the Bureau has largely eliminated these errors for on-spine geographies. Consequently, for larger geographical areas such as congressional districts, which can be decomposed as a large number of tracts plus several additional block groups or blocks, the racial biases only manifest in the latter additions and are relatively small in magnitude. In contrast, the previous DAS-12.2 contained racial biases for on-spine geographies as well, which were magnified by aggregation and did not disappear, leading to large population shifts in current congressional districts. Table S4.3 shows that deviations from 2010 Census totals among all the enacted congressional districts in the states that we studied ranged from −2153 to 2164 under the DAS-12.2 data, but under the DAS-19.61 data, the range of deviations is only −216 to 319. This constitutes a nearly 10-fold improvement.

Simulation analysis

Population parity in redistricting. By increasing the privacy loss budget to 19.61, we expect total population errors at large geographic levels such as complete districts to be smaller than in previous releases. The population of congressional districts (as of 2019) according to the DAS-19.61 differs from the actual Census counts by an order of magnitude smaller than that according to the DAS-12.2 (table S4.3). However, leaving VTDs "off-spine" means that discrepancies could still be present.

We repeat the parity analysis with the new DAS-19.61 data. As before, we generated 35,000 Louisiana State Senate maps (5000 for each of seven tolerances) under each dataset (for 70,000 total) and measured the fraction of plans that would be rendered invalid. Figure S4.4 shows the results from this analysis. Unlike the previous releases of DAS-4.5 and DAS-12.2, the enacted map would still be valid at an intended population tolerance of 5% under DAS-19.61. These errors are lower than those found in Fig. 4 for DAS-12.2 and DAS-4.5, rendering the majority of plans at generous tolerances such as 5% valid in both cases.

However, plans generated with strict parity goals can still be found invalid at high rates. This means that plans created with a particular parity goal in mind may, in reality, exceed that goal in some cases, with the likelihood of such a mistake happening increasing as the parity tolerance is lowered.

Partisan effects on redistricting. Our reanalysis of racial and partisan biases found that biases persist at the VTD level but generally disappear when VTDs are aggregated to larger, fixed, geographic areas. Here, we reanalyze the effect of these smaller-scale VTD biases on simulation analyses of partisan and racial gerrymandering. Do the small-scale errors continue to cause spurious shifts and incorrect conclusions from redistricting simulations, as in Fig. 5? Or does the large size of the simulated legislative districts compared to individual VTDs protect against bias?

Unfortunately, as fig. S4.5 shows, DAS-19.61 data display qualitatively similar patterns to the DAS-12.2 and DAS-4.5 data. While, for many simulated districts, there is close agreement between the results for Census 2010 and DAS-protected data, for some districts (see Pennsylvania, ordered district 15, and South Carolina State House, ordered districts 111 to 115 and 121 to 124), the DAS-based simulations differ by several percentage points, which can shift the direction of a plan's measured partisan bias.

Racial effects on redistricting. The results for racial gerrymandering are similarly troubling. Figure S4.6 shows DAS-19.61 results following the layout of its counterpart in Fig. 6. The same areas for which the DAS-12.2 and DAS-4.5 simulations diverged from the 2010 Census ground truth prove problematic for the DAS-19.61 as well (South Carolina State House, ordered districts 96 to 110 and 121 to 124; Mississippi State Senate, ordered districts 49 to 52; and Pennsylvania, ordered district 16).

How should we reconcile these findings with the fact that biases in the overall population totals at the legislative district level appear to have been rectified by DAS-19.61? We suspect that the simulation process, which constantly makes calculations from and reassigns districts for individual VTDs, is driven more by local considerations than fixed tabulations are. Analogous to population parity simulations, the aggregated calculations performed by the simulation algorithms and resulting analyses depend on the noisy data themselves; this is crucially different from tabulations of existing geographic areas that have been defined without reference to it.

We next examine how the DAS-19.61 affects which VTDs belong to an MMD. We again simulate 50,000 maps using each dataset at a wide variety of constraint strengths that target the creation of MMDs. The results are shown in fig. S4.7, and they are substantively similar to the results based on the prior demonstration data presented in Fig. 7. Specifically, we find that some precincts are always contained in an MMD when maps are drawn using the original Census but never under DAS (or vice versa). As before, the magnitude of these differences is generally larger for higher values of the constraint than for lower values.

Ecological inference and voting rights analysis

Prediction of individual voters' race and ethnicity. We examine whether the DAS-19.61 affects the prediction of individual voters' race and ethnicity. Figure S4.8 presents the AUROC results for different racial groups using this final demonstration dataset. We compare the results against those in Fig. 8. We find that, by and large, our conclusions are unchanged. The DAS-19.61 data allow for the prediction of individual voters' race and ethnicity with almost identical levels of accuracy to the 2010 Census data. The empirical performance of the BISG methodology based on the DAS-19.61 has a similar pattern: It typically performs about the same for White and Black voters, slightly better for Hispanic voters, and slightly worse for Asian and other voters. Although the unexpected finding of the DAS-12.2 analysis, superior predictive performance using the privacy-protected data, is no longer present here, there is also no significant degradation in prediction quality relative to the 2010 Census data.

Table S4.1 reports misclassification rates of the BISG methodology based on the DAS-19.61 data where we assign each individual to the single ethnic group with the highest posterior probability. We can compare these against the analogous results for the 2010 census, DAS-12.2, and DAS-4.5 data given in tables S1.1, S1.2, and S1.3. The conclusions are largely similar using these metrics too: Classification error for individual voters' race and ethnicity is at the same level using the DAS-19.61 data, as it is using the 2010 Census data.

Ecological inference in the voting rights analysis. We repeat our analysis of the ERCSD to examine the effect of the final DAS-19.61 on local redistricting. Using the same geocoded voter file, we impute race onto the voter file using the BISG with the geographic priors from the DAS-19.61 data. Figure S4.9 displays the imputed races, aggregated to the block level, which is the basic geographic unit for building districts in this case. Consistent with the DAS-12.2 data, the DAS-19.61 data tend to result in overestimates of White voters and thus underestimates of Black and Hispanic voters.

We find that similar to the previous demonstration data, the block-level undercounts of minority voters do not disappear at the school board ward level in this case. Under DAS-19.61, we find underestimation of majority-minority wards in line with findings under DAS-12.2. As shown in table S4.2, among sampled districts, MMDs are always underestimated in this local case.

MATERIALS AND METHODS

Redistricting simulation methodology

The goal of redistricting simulation methods is to generate a collection of redistricting plans that are representative of the set of all plans that satisfy applicable redistricting criteria. These criteria may be set out explicitly in state law or may be derived from traditional principles or court cases. The simulation methods applied here were designed to sample plans from a specific probability distribution that reflects the most common redistricting requirements: that each district (i) be geographically contiguous, (ii) have a population that deviates by no more than a specified amount from a target population that corresponds to population equality across districts, (iii) be compact (we use a graph-theoretic measure of compactness that counts how many internal edges must be removed to form the districts), and (iv) avoid splitting counties so as to follow political subdivision boundaries where possible.

Some simulations here also reflect a fifth constraint, which is that the districts satisfy the requirements of the federal Voting Rights Act.

This is accomplished by changing the sampling distribution to put more probability mass on plans that have a certain fraction of minority voters in a district. Formally, the target probability distribution can be written as

$$\pi(\xi) \propto \exp\{-J(\xi)\}\tau(\xi)^{\rho} 1_{\{\xi \text{ connected}\}} 1_{\{\text{dev}(\xi)\leq D\}} \quad (1)$$

where ξ is a redistricting map, $\tau(\xi)$ measures the degree of compactness (operationalized as the number of spanning forests on a partitioned graph), ρ is a parameter chosen to control the level of compactness, dev(ξ) measures the percent deviation from population parity as defined in the article, and $J(\xi)$ is an additional constraint such as those related to the Voting Rights Act. This probability distribution is desirable because it represents the unique maximum entropy distribution on the set of redistricting maps that satisfy contiguity and population party requirements as well as moment conditions implied by compactness and additional constraints. The distribution is also able to accommodate a variety of constraints that are used in real-world redistricting processes.

We use two algorithms to sample from this target distribution: an SMC algorithm (*23*) and a merge-split–type MCMC algorithm that uses the same transition kernel (*19*, *20*). Both of these sampling algorithms are implemented in the open-source software package "redist" (*24*). The SMC algorithm operates by drawing districts one at a time on a blank map. Each district is formed by drawing a random spanning tree and removing a certain edge from it, creating a "split" in the map that forms a new district. As redistricting plans are formed from these districts, they are periodically weighted and reshuffled so that the sampled plans approximate the target distribution. The MCMC algorithm also forms districts by drawing a random spanning tree and splitting it, but rather than drawing redistricting plans from scratch, it starts with an existing plan and modifies it, merging a random pair of districts and then splitting them a new way. Diagnostic measures exist for both these algorithms that allow users to identify issues in accurate sampling from the target probability distribution. The original papers for these algorithms provide more detail on the algorithm specifics, empirical validation of their performance, and the appropriateness of the chosen target distribution.

Prediction of individual race and ethnicity using names and residence location

Our approach follows that of (*27*). We denote by E_i the race and ethnicity of voter i, N_i as the name of voter i, and G_i as the geography in which voter i resides. For each choice of race and ethnicity $e \in \mathcal{E}$ = {White, Black, Hispanic, Asian, Other}, Bayes' rule implies

$$\Pr(E_i = e \mid N_i = n, G_i = g) = \frac{Pr(N_i = n \mid E_i = e)\, Pr(E_i = e \mid G_i = g)}{\sum_{e' \in \mathcal{E}} Pr(N_i = n \mid E_i = e')\, Pr(E_i = e' \mid G_i = g)}$$

where we have assumed conditional independence between the surname of a voter and their geolocation within each racial category, i.e., $N_i \perp\!\!\!\perp G_i \mid E_i$.

In the presence of multiple names, e.g., first name f, middle name m, and surname s, we make the further conditional independence assumption (*56*)

$$\Pr(N_i = \{f, m, s\} \mid E_i = e) = \Pr(F_i = f \mid E_i = e) \Pr(M_i = m \mid E_i = e) \Pr(S_i = s \mid E_i = e)$$

where F_i, M_i, and S_i represent individual i's first, middle, and surnames, respectively.

SUPPLEMENTARY MATERIALS

Supplementary material for this article is available at https://science.org/doi/10.1126/sciadv.abk3283

View/request a protocol for this paper from *Bio-protocol*.

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Acknowledgments: We thank A. Cohen, G. Evans, A. Goldbloom-Helzner, G. King, A. H. Rivero, and S. Wang for comments on the initial draft of this article, which was prepared in response to the Census Bureau's April 2021 request for public feedback. We also thank B. Willsie of L2 Inc. for providing voter file data. **Funding:** We acknowledge that we received no funding in support of this research. **Author contributions:** C.T.K., C.M., K.I., S.K., and T.S. conceived the project. All contributed to the design of analyses. C.T.K., C.M., E.T.R.R., S.K., and T.S. implemented the analyses. K.I. supervised the research. All contributed to the writing of the manuscript. **Competing interests:** The authors declare that they have no competing interests. **Data and materials availability:** Code and datasets for replication are available at https://doi.org/10.7910/DVN/TNNSXG. All data needed to evaluate the conclusions in the paper are present in the paper and/or the Supplementary Materials.

Submitted 12 July 2021
Accepted 15 September 2021
Published 6 October 2021
10.1126/sciadv.abk3283

Citation: C. T. Kenny, S. Kuriwaki, C. McCartan, E. T. R. Rosenman, T. Simko, K. Imai, The use of differential privacy for census data and its impact on redistricting: The case of the 2020 U.S. Census. *Sci. Adv.* **7**, eabk3283 (2021).

ScienceAdvances

The use of differential privacy for census data and its impact on redistricting: The case of the 2020 U.S. Census

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Sci. Adv., 7 (41), eabk3283.

Science Advances (ISSN) is published by the American Association for the Advancement of Science. 1200 New York Avenue NW, Washington, DC 20005. The title *Science Advances* is a registered trademark of AAAS.

EXHIBIT F

EXHIBIT F

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

MICHAEL BANERIAN, et al., Plaintiffs, v. JOCELYN BENSON, et al., Defendants.	**Case No. 1:22-CV-00054-RMK-JTN-PLM**

DECLARATION OF KIMBALL BRACE

I, Kim Brace, declare and state pursuant to 28 U.S.C. § 1746 as follows:

1. My name is Kimball William Brace. I am the president of Election Data Services, Inc. ("EDS, Inc."), a Manassas, Virginia-based consulting firm whose specialty is reapportionment, redistricting matters, election administration issues, and the census.

2. All the materials considered in forming the opinions contained herein are identified in this report.

3. A copy of my curriculum vitae is attached as **Exhibit A**, which includes a complete list of cases in which I have testified as an expert at trial or by deposition.

Michigan Redistricting Experience in 2021 to current

4. In March 2021, Election Data Services, Inc. was selected as the vendor to provide Map Drawing support to the Michigan Independent Citizens Redistricting Commission (MICRC). My company was selected through a competitive bid process to provide full support services to the Michigan Independent Citizens Redistricting Commission (MICRC) during the redistricting process. These services included building a full redistricting database (composed of Census data

and geography, along with political data and precinct geography), providing a full suite of redistricting software for the Commissioners and staff to use to draw district configurations, providing map drawing staffers (either myself at the beginning or subcontractors Kent Stigall and John Morgan) to perform the actual district creation in the software at the direction of Commissioners in open and fully transparent public meetings that were televised, along with creation of analytic software to help the Commissioners understand the racial and political data utilized in the map drawing process. All of this effort and system is now being utilized with regard to the redistricting cases consolidated in the above-captioned matter.

5. This work encompassed a multitude of different activities and tasks. Initially we were responsible for creating a massive database of 1) Census data (the results of the PL 94-171 program when it was released in August, 2021), 2) all Census geography (as provided by the Census Bureau's Topologically Integrated Geographic Encoding and Reference files (TIGER)), along with 3) political data (precinct level election results usually compiled by the Michigan Secretary of State back to 2012) and 4) political geography (the configuration of precincts to correspond to the election data, in many instances reflecting precinct changes that occurred during the decade). I have commonly termed these four elements of a redistricting database as the "redistricting data cube" when I make presentations to groups or the court. We also provided the redistricting software (in Michigan's instance it was the AutoBound Redistricting system for 2020 (called AutoBound EDGE)) and helped the state install it on every Commissioner's state-provided laptop. Support to the Commissioners for their individual needs was also provided.

6. Our contract also provided that we have staff that would operate the redistricting software and draw district possibilities at the direction of Commission members. I, or my subcontracting staff of Kent Stigall and John Morgan, were at every meeting of the Commission

to perform the tasks of actually drawing the districts using Commissioner's thoughts and directions in the AutoBound EDGE software.

7. Even before the PL 94-171 Census data arrived in August 2021, we purchased commercially available population estimates from a demographic and GIS company called ESRI and incorporated them into the AutoBound EDGE system so that draft mapping could take place. At the same time, we incorporate the concepts of Community of Interests (COIs) and built linkages to software and data files generated by MIT that allowed the public to recommend and draw their own concept of Community of Interests for submission to the MICRC.

8. Shortly after our contract started, we went into significant teaching and training mode with the Commission. I did extensive education programs for the Commission (and the public since all these sessions were televised live as well as taped for storage on the MICRC's YouTube page so that the public could view commission meetings at any time). These included all aspects and definitions used in the redistricting process. I designed special in-depth hour-long training sessions that focused upon each of the four pieces of the "redistricting data cube," including examples of how the pieces appear in Michigan.

9. During the life of the contract, we modified or developed separate computer programs to help analyze plans and line drawings done by the Commission. One of our longstanding programs is what we call "AvsB" which allows us to compare, for example, two different plans to see how much is assigned to identical districts, or the amount of population and geography that is configured differently. The AvsB reports are utilized in this declaration.

10. In conjunction with another subcontractor, political scientist Lisa Handley, we created special software to analyze the extent of racial bloc voting in different parts of the state as well as calculate various political science measures to investigate political fairness (one of the

criteria dictated by Michigan law that created the MICRC). The political fairness analysis and reports are utilized in this declaration.

Plaintiffs' Proposed Alternative Plan

11. Plaintiffs' complaint proposed an alternative plan to the court. Plaintiffs' effort to create a plan that has a deviation of only one person from the ideal population for any of the 13 congressional districts is only achievable by unnecessarily splitting the state's counties, townships, cities and precincts into such small pieces that they will expose voter's secrecy of the ballot. In addition, it appears the plaintiffs' have sought to change the political leaning of a number of districts and thereby reverse the efforts of the Commission to create a "politically fair" plan.

12. **Exhibit B** to this declaration is a graphic map showing the Chestnut Congressional Plan drawn by the MICRC (with the districts shaded by the district number), with an overlay of the Plaintiff's plan boundaries in red outline. Because the Upper Peninsula of the state is identical between the two plans, **Exhibit C** to this declaration is a zoomed in portion of the same map, showing just the lower part of the state. **Exhibit D** to this declaration is a 13-page set of maps, one for every Congressional District, showing in a gray hatched pattern the district in the Chestnut plan and a black boundary for the Plaintiff's congressional plan for that district.

13. **Exhibit E** to this declaration is an extract of our normal AvsB report, in this instance comparing the Plaintiffs' plan against counties in the state. This exhibit shows all the counties that are split in the Plaintiffs' plan for Congress and the amount of population in each piece of a split county. The Plaintiff's plan splits 10 different counties, with Oakland County split four ways and Wayne County split three ways. All the other eight counties have two pieces each in their plan. While Oakland County has parts of four districts, only one of those are wholly

contained in the county. Each of the other three parts contribute only 38%, 20% and 6% of the other districts, so they are not majority factors in those districts.

14. **Exhibit F** to this declaration is an extract of our normal AvsB report, in this instance comparing the Plaintiffs' plan against townships in the state. This exhibit shows all the townships that are split in the Plaintiffs' plan for Congress and the amount of population in each piece of a split township. The extremeness of the Plaintiffs' attempt to create districts that all have the same population can be seen in how they split Southfield township in Oakland County. Plaintiffs' map pulled just 13 people out of the town's 91,504 population to place them in district 11, clearly exposing any voter's vote in an election and violating the secrecy of the ballot. The Plaintiffs' plan also pulled just 19 people out of Ross Township in Kalamazoo County to place them in District 4, creating a small pocket of voters that will cause problems for the town clerk. In addition, Plaintiffs' map splits small townships in half unnecessarily, including Orange Township in Ionia County and Wexford Township in Wexford County. Finally, Caledonia Township in Shiawassee County loses just 5.6% of its 4,360 people into District 8 in the Plaintiffs' plan.

15. **Exhibit G** to this declaration performs the same split township analysis on the Commission's Chestnut Congressional plan. There are no instances of extreme small populations in a piece of a township. The smallest split of a township in the Commission's plan is in Royalton Township in Berrien County where 186 people are placed in District 4. While there is one more township split in the Commission's plan compared to what is presented by the Plaintiffs, the Commission looked are a much wider array of different data and matrixes in creating their plan than the Plaintiffs' seemingly focus on just total population equality.

16. But the Commission's Chestnut plan was not a single-minded exercise to create districts that matched the same population number, but instead were a long exhausting effort to look at multiple factors governing the development of a plan. The commission spent multiple sessions stretching out over many hours developing and modifying the steps and procedures they would follow to develop a redistricting plan. They were governed by the language enacted by the voters in the redistricting referendum passed in 2018, as well as the training I gave them, particularly to be observant of the effects of the lines on clerk's efforts to conduct an election.

17. The plaintiff's plan also does damage to a number of the state's cities, splitting 13 cities in total. **Exhibit H**, attached to this declaration shows all the cities (the Census Bureau calls them "places") that are split in the Plaintiffs' plan. It should be noted that a number of the splits have very small pieces pulled out to be in a different district. For example, only 36 people were pulled out of Fenton City's 12,050 population, or 77 people were cut off from the 2,647 people in the Village of Grosse Pointe Shores. Even the small cities of Hubbardston village, Otter Lake village and Reese village were further split apart in the plaintiff's plan.

18. Like townships, the plaintiffs paid little attention to how many precincts they split in creating their plan. While precincts can change because of the redistricting process, it is also important to recognize that maintaining precinct configurations make the implementation of the plan by city and town clerks easier because they already have the older precincts' configuration defined in the voter registration system's street file. All of my research over the past 50 years shows that voters are more likely to be incorrectly assigned to a correct precinct at the beginning of the decade, just after redistricting takes place.

19. **Exhibit I** to this affidavit shows all the precincts (known as VTDs by the Census Bureau) are split in the Plaintiff's proposed plan and the amount of population that is separated

from the precinct. This two-page exhibit shows several instances where tiny pieces have been pulled out of the precincts to match the plaintiff's goal of having all their districts equally populated.

I declare under penalty of perjury that to the best of my memory the foregoing is true and correct.

Executed this 18 day of February, 2022, at Manassas, VA

Kimball Brace

List of Exhibits Attached to Declaration of Kimball Brace

A. Kimball Brace Vita

B. Statewide map of Chestnut plan by MICRC with overlay of Plaintiff's plan

C. Zoomed in map of Chestnut Plan with Plaintiff's Plan overlay

D. 13 page map set depicting individual congressional districts maps with gray hatch pattern for the Chestnut Plan and black overlay for the Plaintiff's plan.

E. Table of Counties split in Plaintiff's plan for Congress.

F. Table of Townships split in Plaintiff's plan for Congress.

G. Table of Townships split in Chestnut plan for Congress.

H. Table of cities (places) split in Plaintiff's plan for Congress.

I. Table of precincts (VTDs) split in Plaintiff's plan for Congress.

Exhibit A

VITA

KIMBALL WILLIAM BRACE

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Kimball Brace is the president of Election Data Services Inc., a consulting firm that specializes in redistricting, election administration, and the analysis and presentation of census and political data. Mr. Brace graduated from the American University in Washington, D.C., (B.A., Political Science) in 1974 and founded Election Data Services in 1977.

Redistricting Consulting

Activities include software development; construction of geographic, demographic, or election databases; development and analysis of alternative redistricting plans; general consulting, and onsite technical assistance with redistricting operations.

Congressional and Legislative Redistricting

Arizona Independent Redistricting Commission: Election database, 2001

Arizona Legislature, Legislative Council: Election database, 2001

Colorado General Assembly, Legislative Council: Geographic, demographic, and election databases, 1990–91

Connecticut General Assembly

- Joint Committee on Legislative Management: Election database, 2001; and software, databases, general consulting, and onsite technical assistance, 1990–91
- Senate and House Democratic Caucuses: Demographic database and consulting, 2001

Florida Legislature, House of Rep.: Geographic, demographic, and election databases, 1989–92

Illinois General Assembly

- Speaker of House and Senate Minority Leader: Software, databases, general consulting, and onsite technical assistance, 2000–02,
- Speaker of House and President of Senate: Software, databases, general consulting, and onsite technical assistance, 2018-current, 2009-2012, 1990–92, and 1981-82

Iowa General Assembly, Legislative Service Bureau and Legislative Council: Software, databases, general consulting, and onsite technical assistance, 2000–01 and 1990–91

Kansas Legislature: Databases and plan development (state senate and house districts), 1989

Massachusetts General Court

- Senate Democratic caucus: Election database and general consulting, 2001–02
- Joint Reapportionment Committees: Databases and plan development (cong,, state senate, and state house districts), 1991–93, 2010-2012

(Redistricting Consulting, cont.)

Michigan Legislature: Geographic, demographic, and election databases, 1990–92; databases and plan development (cong., state senate, and state house districts), 1981-82

Missouri Redistricting Commission: General consulting, 1991–92

Commonwealth of Pennsylvania: General consulting, 1992

Rhode Island General Assembly and Reapportionment Commissions

- Software, databases, plan development, and onsite assistance (cong., state senate, and state house districts), 2016- current, 2010-2012, 2001–02 and 1991–92
- Databases and plan development (state senate districts), 1982-83

State of South Carolina: Plan development and analysis (senate), U.S. Dept. of Justice, 1983–84

Local Government Redistricting

Orange County, Calif.: Plan development (county board), 1991–92

City of Bridgeport, Conn.: Databases and plan development (city council), 2011-2012 and 2002–03

Cook County, Ill.: Software, databases, and general consulting (county board), 2010-2012, 2001–02, 1992–1993, and 1989

Lake County, Ill.: Databases and plan development (county board), 2011 and 1981

City of Chicago, Ill.: Software, databases, general consulting, and onsite technical assistance (city wards), 2010-2012, 2001–02 and 1991–92

City of North Chicago, Ill.: Databases and plan development (city council), 1991 and 1983

City of Annapolis, Md.: Databases and plan development (city council), 1984

City of Boston, Mass.: Databases and plan development (city council), 2011-2012, 2001-2002, and 1993

City of New Rochelle, N.Y.: Databases and plan development (city council), 1991–92

City of New York, N.Y.: Databases and plan development (city council), 1990–91

Cities of Pawtucket, Providence, East Providence, and Warwick, and town of North Providence, R.I.: Databases and plan development (city wards and voting districts), 2011-2012, 2002

City of Woonsocket and towns of Charlestown, Johnston, Lincoln, Scituate and Westerly, R.I.: Databases and plan development (voting districts), 2011-2012, 2002; also Westerly 1993

City of Houston, Tex.: Databases and plan development (city council), 1979 — recommended by U.S. Department of Justice

City of Norfolk, Va.: Databases and plan development (city council), 1983–84 — for Lawyers' Committee for Civil Rights

Virginia Beach, Va.: Databases and plan development (city council), 2011-2012, 2001–02, 1995, and 1993

Other Activities

International Foundation for Electoral Systems (IFES) and U.S. Department of State: redistricting seminar, Almaty, Kazakhstan, 1995

Library of Congress, Congressional Research Service: Consulting on reapportionment, redistricting, voting behavior and election administration

National Conference of State Legislatures (NCSL): Numerous presentations on variety of redistricting and election administration topics, 1980 - current

Election Administration Consulting

Activities include seminars on election administration topics and studies on voting behavior, voting equipment, and voter registration systems.

Prince William County, VA:
2013 – Appointed by Board of County Supervisors to 15 member Task Force on Long Lines following 2012 election. Asked and appointed by County's Electoral Board to be Acting General Registrar for 5-month period between full-time Registrars.
2008 - current – poll worker and now chief judge for various precincts in county

U.S. Election Assistance Commission (EAC): Served as subcontractor to prime contractors who compiled survey results from 2008 and 2010 Election Administration and Voting Survey.

U.S. Election Assistance Commission (EAC): Compile, analyze, and report the results of a survey distributed to state election directors during FY–2007. Survey results were presented in the following reports of the EAC: *The Impact of the National Voter Registration Act of 1993 on the Administration of Elections for Federal Office, 2005–2006, A Report to the 110th Congress,* June 30, 2007; *Uniformed and Overseas Citizens Absentee Voting Act (UOCAVA), Survey Report Findings,* September, 2007; and *The 2006 Election Administration and Voting Survey, A Summary of Key Findings,* December, 2007.

U.S. Election Assistance Commission (EAC): Compile, analyze, and report the results of three surveys distributed to state election directors during FY–2005: Election Day, Military and Overseas Absentee Ballot (UOCAVA), and Voter Registration (NVRA) Surveys. Survey results were presented in the following reports: *Final Report of the 2004 Election Day Survey,* by Kimball W. Brace and Dr. Michael P. McDonald, September 27, 2005; and *Impact of the National Voter Registration Act of 1993 on the Administration of Elections for Federal Office, 2003–2004, A Report to the 109th Congress,* June 30, 2005.

Rhode Island Secretary of State: Verification of precinct and district assignment codes in municipal registered voter files and production of street files for a statewide voter registration database, on-going maintenance of street file, 2004-2006, 2008-2014, 2016-2017.

Rhode Island Secretary of State, State Board of Elections & all cities & towns: production of precinct maps statewide, 2012, 2002, 1992

District of Columbia, Board of Elections and Ethics (DCBOEE): Verification of election ward, Advisory Neighborhood Commission (ANC), and Single-Member District (SMD) boundaries and production of a new street locator, 2003. Similar project, 1993.

Harris County, Tex.: Analysis of census demographics to identify precincts with language minority populations requiring bilingual assistance, 2002–03

(Election Administration Consulting, cont.)

Cook County, Ill., Election Department and Chicago Board of Election Commissioners:
- Analysis of census demographics to identify precincts with language minority populations requiring bilingual assistance, 2019, 2010-2013, 2002–03
- Study on voting equipment usage and evaluation of punch card voting system, 1997

Chicago Board of Election Commissioners: Worked with Executive Director & staff in Mapping Dept. to redraw citywide precincts, eliminate over 600 to save costs, 2011-12

Library of Congress, Congressional Research Service: Nationwide, biannual studies on voter registration and turnout rates, 1978–2002

U.S. General Accounting Office (GAO), U.S. Dept. of Justice, and numerous voting equipment vendors and media: Data on voting equipment usage throughout the United States, 1980–present

Needs assessments and systems requirement analyses for the development of statewide voter registration systems:
- Illinois State Board of Elections: 1997
- North Carolina State Board of Elections, 1995
- Secretary of Commonwealth of Pennsylvania, 1996

Federal Election Commission, Office of Election Administration:
- Study on integrating local voter registration databases into statewide systems, 1995
- Nationwide workshops on election administration topics, 1979–80
- Study on use of statistics by local election offices, 1978–79

Cuyahoga County, Ohio, Board of Elections: Feasibility study on voting equipment, 1979

Winograd Commission, Democratic National Committee: Analysis of voting patterns, voter registration and turnout rates, and campaign expenditures from 1976 primary elections

Mapping and GIS

Activities include mapping and GIS software development (geographic information systems) for election administration and updating TIGER/Line files for the decennial census.

2000 Census Transportation Planning Package (CTPP), 1998–99: GIS software for the U.S. Department of Transportation to distribute to 400 metropolitan planning organizations (MPOs) and state transportation departments for mapping traffic analysis zones (TAZs) for the 2000 census; provided technical software support to MPOs

Census 2000, 2010 and 2020 Redistricting Data Program, Block Boundary Suggestion Project (Phase 1) and Voting District Project (Phase 2), 1995–99: GIS software and provided software, databases, and technical software support to the following program participants:
- Alaska Department of Labor
- Connecticut Joint Committee on Legislative Management
- Illinois State Board of Elections
- Indiana Legislative Services Agency
- Iowa Legislative Service Bureau

(Mapping & GIS Support, cont.)

- New Mexico Legislative Council Service
- Rhode Island General Assembly
- Virginia Division of Legislative Services

Developed PRECIS® Precinct Information System—GIS software to delineate voting precinct boundaries—and delivered software, databases, and technical software support to the following state and local election organizations (with date of installation):

- Cook County, Ill., Department of Elections (1993)
- Marion County, Fla., Supervisor of Elections (1995)
- Berks County Clerk, Penn. (1995)
- Hamilton County, Ohio, Board of Elections (1997)
- Brevard County, Fla., Supervisor of Elections (1999)
- Osceola County, Fla., Supervisor of Elections (1999)
- Multnomah County, Ore, Elections Division (1999)
- Chatham County, Ga., Board of Elections (2000)
- City of Chicago, Ill., Board of Election Commissioners (2000)
- Mahoning County, Ohio, Board of Elections (2000)
- Iowa Secretary of State, Election and Voter Registrations Divisions (2001)
- Woodbury County, Iowa, Elections Department (2001)
- Franklin County, Ohio, Board of Elections (2001)
- Cobb County, Ga., Board of Elections and Voter Registration (2002)

Illinois State Board of Elections, Chicago Board of Election Commissioners, and Cook County Election Department: Detailed maps of congressional, legislative, judicial districts, 1992

Associated Press: Development of election night mapping system, 1994

Litigation Support

Activities include data analysis, preparation of court documents and expert witness testimony. Areas of expertise include the census, demographic databases, district compactness and contiguity, racial bloc voting, communities of interest, and voting systems. Redistricting litigation activities also include database construction and the preparation of substitute plans.

State of Alabama vs. US Department of Commerce, et al (2019-2020) apportionment & citizenship data

NAACP vs. Denise Merrill, CT Secretary of State, et al (2019-2020) state legislative redistricting and prisoner populations

Latasha Holloway, et al. v. City of Virginia Beach, VA (2019) city council redistricting

Joseph V. Aguirre vs. City of Placentia, CA (2018-2019), city council redistricting

Davidson, et al & ACLU of Rhode Island vs. City of Cranston, RI (2014-16), city council & school committee redistricting with prisoner populations.

Navaho Nation v. San Juan County, UT (2014-17) county commissioner & school board districts.

Michael Puyana vs. State of Rhode Island (2012) state legislature redistricting

(Litigation Support, cont.)

United States of America v. Osceola County, Florida, (2006), county commissioner districts.

Deeds vs McDonnell (2005), Va. Attorney General Recount

Indiana Democratic Party, et al., v. Todd Rokita, et al. (2005), voter identification.

Linda Shade v. Maryland State Board of Elections (2004), electronic voting systems

Gongaley v. City of Aurora, Ill. (2003), city council districts

State of Indiana v. Sadler (2003), ballot design (city of Indianapolis-Marion County, Ind.)

Peterson v. Borst (2002–03), city-council districts (city of Indianapolis-Marion County, Ind.)

New Rochelle Voter Defense Fund v. City of New Rochelle, City Council of New Rochelle, and Westchester County Board Of Elections (2003), city council districts (New York)

Charles Daniels and Eric Torres v. City of Milwaukee Common Council (2003), council districts (Wisconsin)

The Louisiana House of Representatives v. Ashcroft (2002–03), state house districts

Camacho v. Galvin and *Black Political Caucus v. Galvin* (2002–03), state house districts (Massachusetts)

Latino Voting Rights Committee of Rhode Island, et al., v. Edward S. Inman, III, et al. (2002–03), state senate districts

Metts, v. Harmon, Almond, and Harwood, et al. (2002–03), state senate districts (Rhode Island)

Joseph F. Parella, et al. v. William Irons, et al. (2002–03), state senate districts (Rhode Island)

Jackson v. County of Kankakee (2001–02), county commissioner districts (Illinois)

Corbett, et al., v. Sullivan, et al. (2002), commissioner districts (St Louis County, Missouri)

Harold Frank, et al., v. Forest County, et al. (2001–02), county commissioner districts (Wisc.)

Albert Gore, Jr., et al., v. Katherine Harris as Secretary of State, State of Florida, et al., and The Miami Dade County Canvassing Board, et al., and The Nassau County Canvassing Board, et al., and The Palm Beach County Canvassing Board, et al., and George W. Bush, et al (2000), voting equipment design — Leon County, Fla., Circuit Court hearing, December 2, 2000, on disputed ballots in Broward, Volusia, Miami-Dade, and Palm Beach counties from the November 7, 2000, presidential election.

Barnett v. Daley/PACI v. Daley/Bonilla v. Chicago City Council (1992–98), city wards

Donald Moon, et al. v. M. Bruce Meadows, etc and Curtis W. Harris, et al. (1996–98), congressional districts (Virginia)

Melvin R. Simpson, et al. v. City of Hampton, et al. (1996–97), city council districts (Va.)

Vera vs. Bush (1996), Texas redistricting

In the Matter of the Redistricting of Shawnee County Kansas and Kingman, et al. v. Board of County Commissioners of Shawnee County, Kansas (1996), commissioner districts

Vecinos de Barrio Uno v. City of Holyoke (1992–96), city council districts (Massachusetts)

(Litigation Support, cont.)

Torres v. Cuomo (1992–95), congressional districts (New York)

DeGrandy v. Wetherell (1992–94), congressional, senate, and house districts (Florida)

Johnson v. Miller (1994), congressional districts (Georgia)

Jackson, et al v Nassau County Board of Supervisors (1993), form of government (N.Y.)

Gonzalez v. Monterey County, California (1992), county board districts

LaPaille v. Illinois Legislative Redistricting Commission (1992), senate and house districts

Black Political Task Force v. Connolly (1992), senate and house districts (Massachusetts)

Nash v. Blunt (1992), house districts (Missouri)

Fund for Accurate and Informed Representation v. Weprin (1992), assembly districts (N.Y.)

Mellow v. Mitchell (1992), congressional districts (Pennsylvania)

Phillip Langsdon v. Milsaps (1992), house districts (Tennessee)

Smith v. Board of Supervisors of Brunswick County (1992), supervisor districts (Virginia)

People of the State of Illinois ex. rel. Burris v. Ryan (1991–92), senate and house districts

Good v. Austin (1991–92), congressional districts (Michigan)

Neff v. Austin (1991–92), senate and house districts (Michigan)

Hastert v. Illinois State Board of Elections (1991), congressional districts

Republican Party of Virginia et al. v. Wilder (1991), senate and house districts

Jamerson et al. v. Anderson (1991), senate districts (Virginia)

Ralph Brown v. Iowa Legislative Services Bureau (1991), redistricting database access

Williams, et al. v. State Board of Election (1989), judicial districts (Cook County, Ill.)

Fifth Ward Precinct 1A Coalition and Progressive Association v. Jefferson Parish School Board (1988–89), school board districts (Louisiana)

Michael V. Roberts v. Jerry Wamser (1987–89), St. Louis, Mo., voting equipment

Brown v. Board of Commissioners of the City of Chattanooga, Tenn. (1988), county commissioner districts

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Buckanaga v. Sisseton School District (1987–88), school board districts (South Dakota)

Griffin v. City of Providence (1986–87), city council districts (Rhode Island)

United States of America v. City of Los Angeles (1986), city council districts

Latino Political Action Committee v. City of Boston (1984–85), city council districts

Ketchum v. Byrne (1982–85), city council districts (Chicago, Ill.)

(Litigation Support, cont.)

State of South Carolina v. United States (1983–84), senate districts — U.S. Dept. of Justice

Collins v. City of Norfolk (1983–84), city council districts (Virginia) — for Lawyers' Committee for Civil Rights

Rybicki v. State Board of Elections (1981–83), senate and house districts (Illinois)

Licht v. State of Rhode Island (1982–83), senate districts (Rhode Island)

Agerstrand v. Austin (1982), congressional districts (Michigan)

Farnum v. State of Rhode Island (1982), senate districts (Rhode Island)

In Re Illinois Congressional District Reapportionment Cases (1981), congressional districts

Publications

"EAC Survey Sheds Light on Election Administration", *Roll Call*, October 27, 2005 (with Michael McDonald)

Developing a Statewide Voter Registration Database: Procedures, Alternatives, and General Models, by Kimball W. Brace and M. Glenn Newkirk, edited by William Kimberling, (Washington, D.C.: Federal Election Commission, Office of Election Administration, Autumn 1997).

The Election Data Book: A Statistical Portrait of Voting in America, 1992, Kimball W. Brace, ed., (Bernan Press, 1993)

"Geographic Compactness and Redistricting: Have We Gone Too Far?", presented to Midwestern Political Science Association, April 1993 (with D. Chapin and R. Niemi)

"Whose Data is it Anyway: Conflicts between Freedom of Information and Trade Secret Protection in Redistricting", *Stetson University Law Review*, Spring 1992 (with D. Chapin and W. Arden)

"Numbers, Colors, and Shapes in Redistricting," *State Government News*, December 1991 (with D. Chapin)

"Redistricting Roulette," *Campaigns and Elections*, March 1991 (with D. Chapin)

"Redistricting Guidelines: A Summary", presented to the Reapportionment Task Force, National Conference on State Legislatures, November 9, 1990 (with D. Chapin and J. Waliszewski)

"The 65 Percent Rule in Legislative Districting for Racial Minorities: The Mathematics of Minority Voting Equality," *Law and Policy*, January 1988 (with B. Grofman, L. Handley, and R. Niemi)

"Does Redistricting Aimed to Help Blacks Necessarily Help Republicans?" *Journal of Politics*, February 1987 (with B. Grofman and L. Handley)

"New Census Tools," *American Demographics*, July/August 1980

Professional Activities

Member, Task Force on Long Lines in 2012 Election, Prince William County, VA

Member, 2010 Census Advisory Committee, a 20-member panel advising the Director of the Census on the planning and administration of the 2010 census.

Delegate, Second Trilateral Conference on Electoral Systems (Canada, Mexico, and United States), Ontario, Canada, 1995; and Third Trilateral Conference on Electoral Systems, Washington, D.C., 1996

Member, American Association of Political Consultants

Member, American Association for Public Opinion Research

Member, American Political Science Association

Member, Association of American Geographers, Census Advisory Committee

Member Board of Directors, Association of Public Data Users

Member, National Center for Policy Alternatives, Voter Participation Advisory Committee

Member, Urban and Regional Information Systems Association

Historical Activities

Member, Manassas Battlefield Trust Board Member, 2018 -- current

Member, Historical Commission, Prince William County, VA., 2015 – current. Elected Chairman in 2017, re-elected 2018

Member of Executive Committee & head of GIS Committee, Bull Run Civil War Round Table, Centerville, VA. 2015 – current

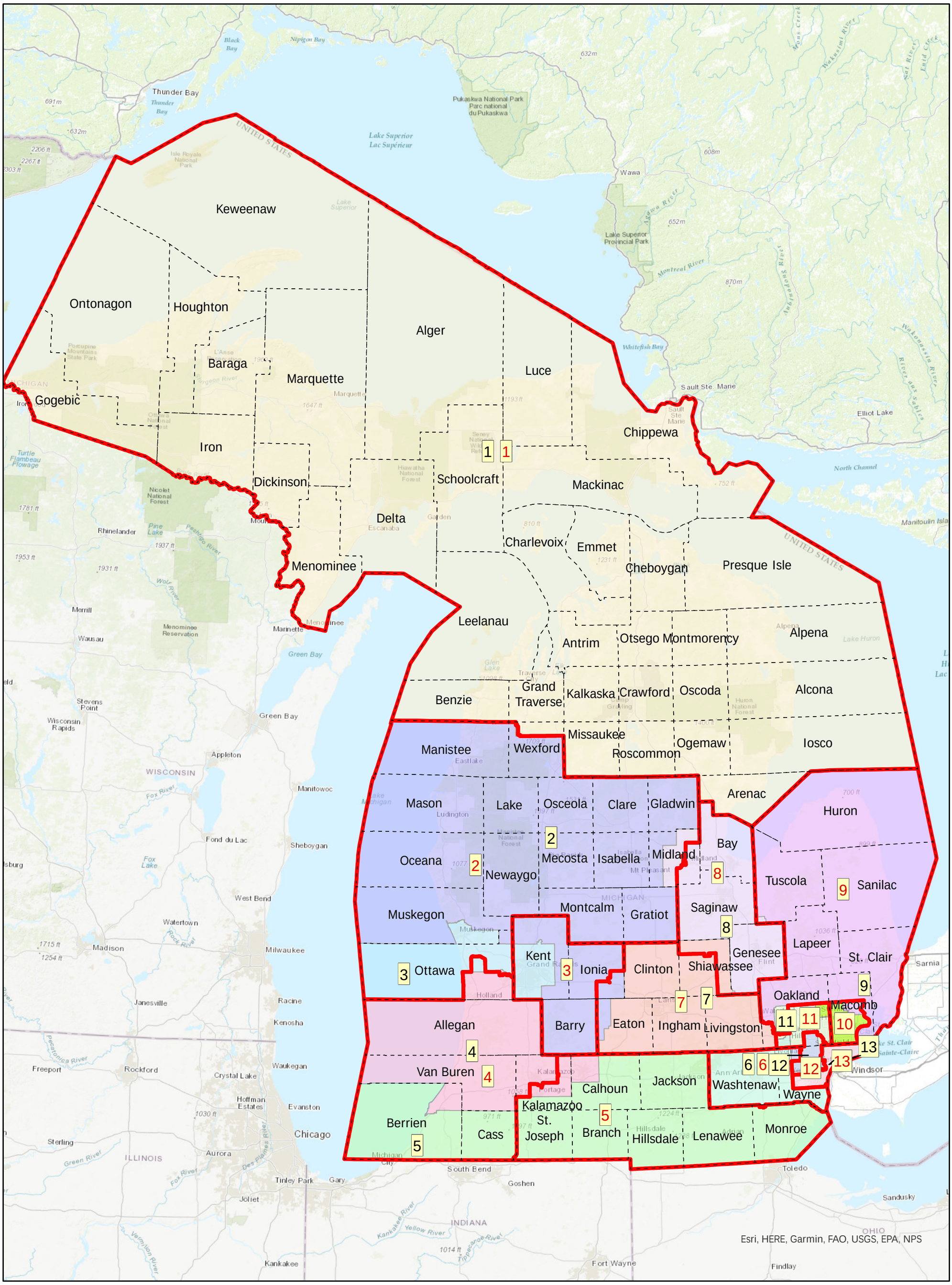
Member, Washington Capitals Fan Club, Executive Board 2017 -- current

February, 2020

Exhibit B

Michigan Redistricting Comparison

Commission Adopted Congressional Plan (Chestnut) vs Plaintiff Congressional Plan



0 20 40 80 Miles

Congressional Districts: Chestnut

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

County

Congressional Districts: Plaintiff

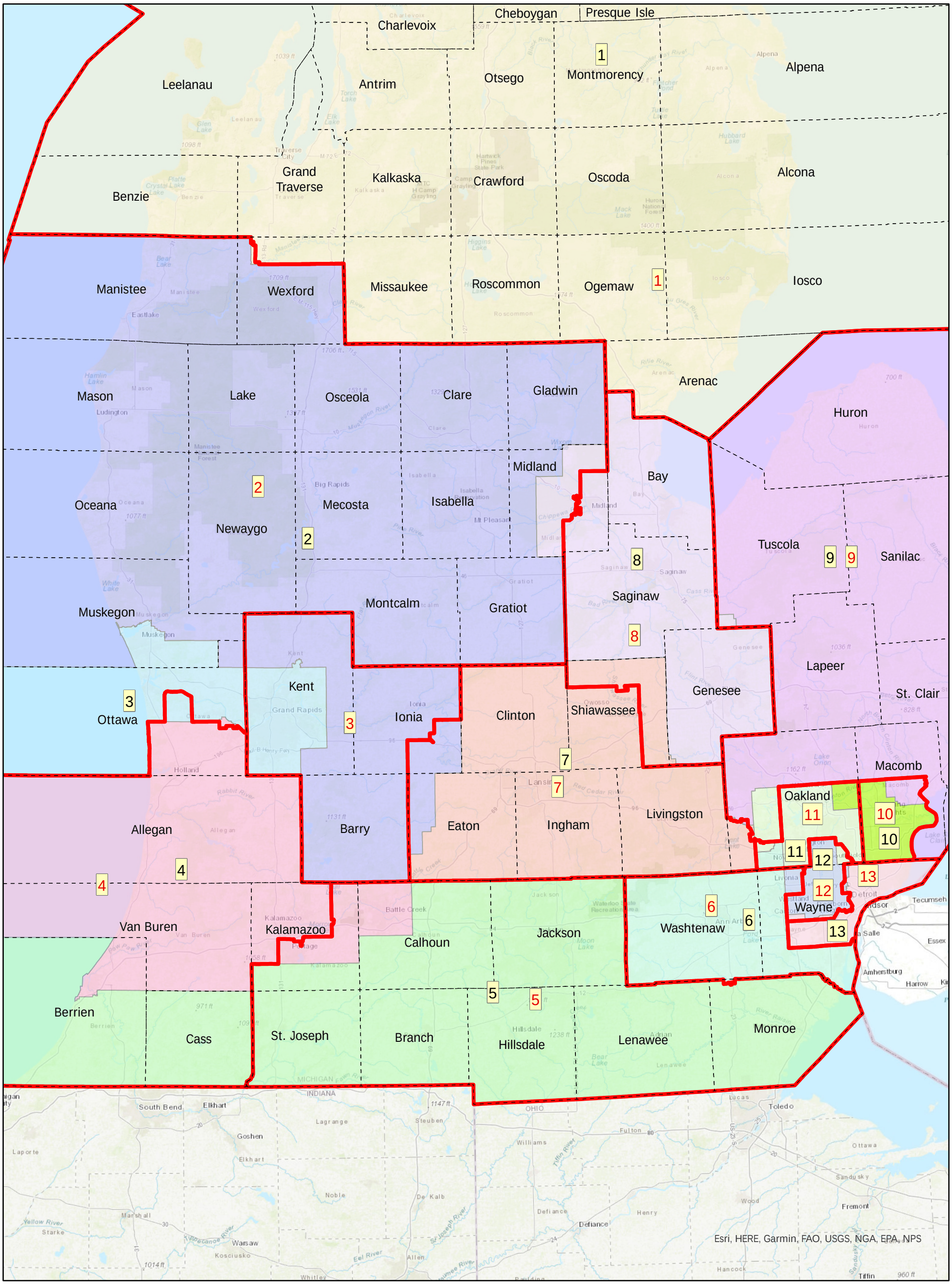
MICHIGAN INDEPENDENT CITIZENS REDISTRICTING COMMISSION

Election Data Services

Exhibit C

Michigan Redistricting Comparison

Commission Adopted Congressional Plan (Chestnut) vs Plaintiff Congressional Plan



0 10 20 40 Miles

Congressional Districts: Chestnut

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

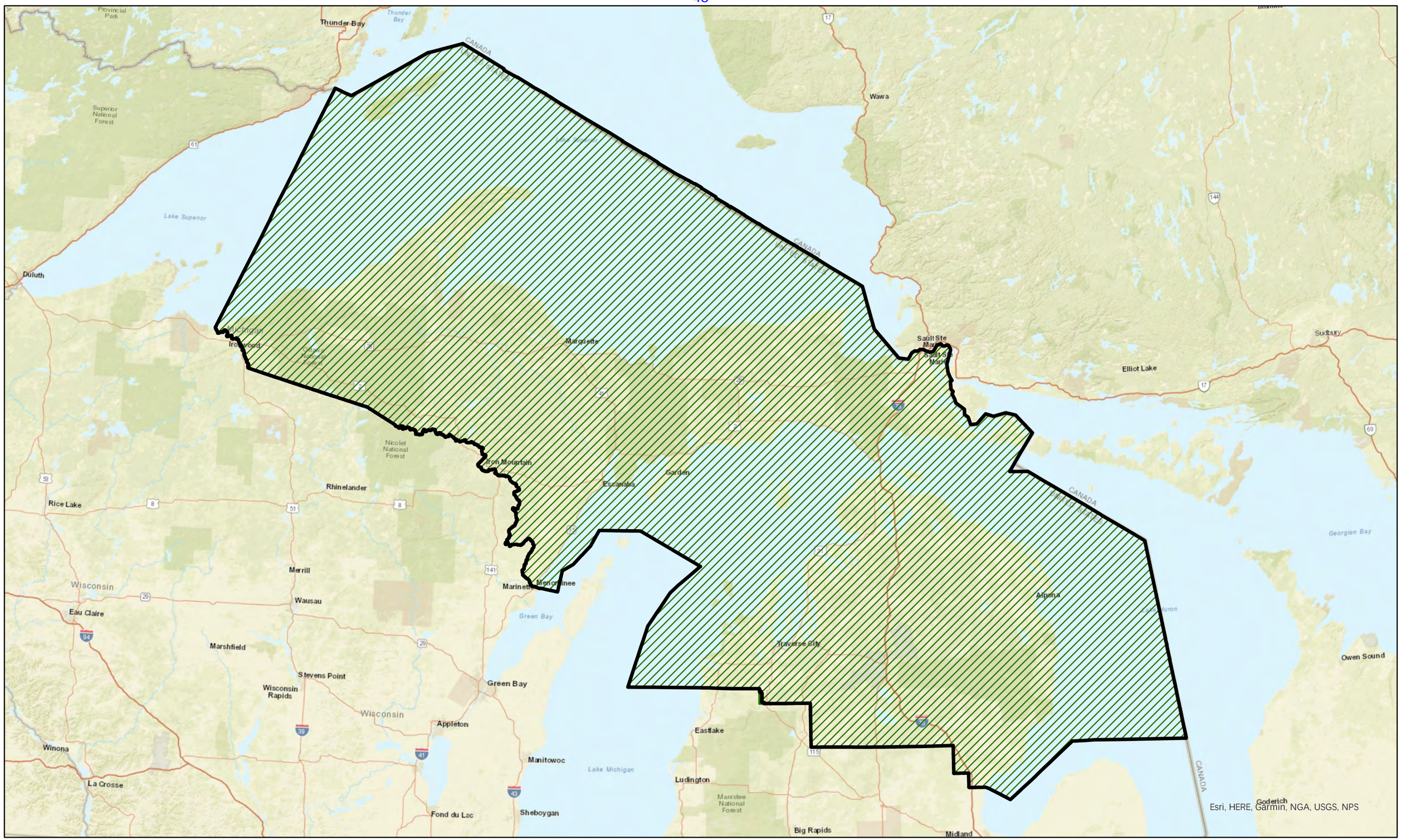
- County
- Congressional Districts: Plaintiff

MICHIGAN INDEPENDENT CITIZENS REDISTRICTING COMMISSION

Election Data Services

Exhibit D

Michigan - Plaintiff Congressional District - 1



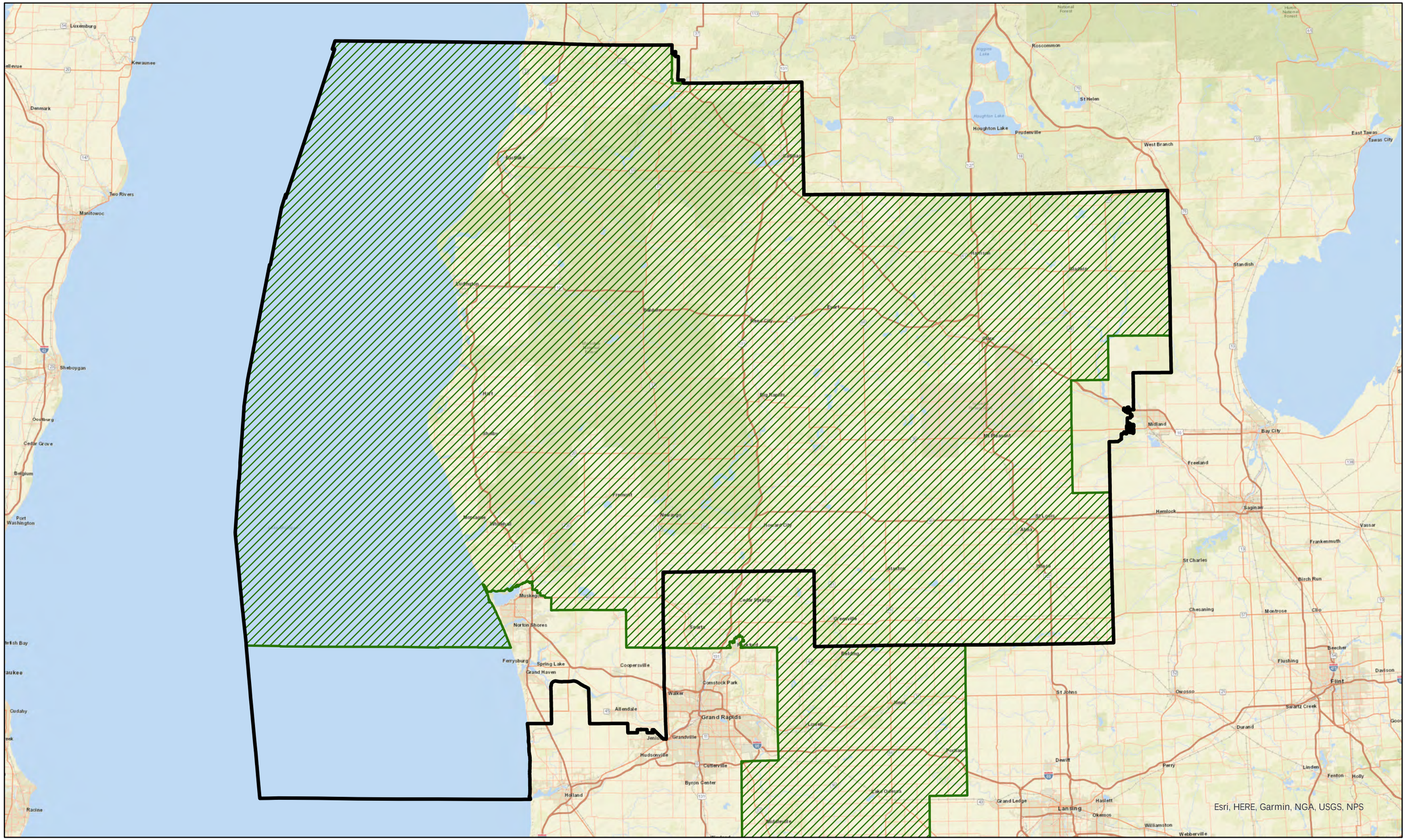
0 25 50 100 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District - 2

Election Data Services



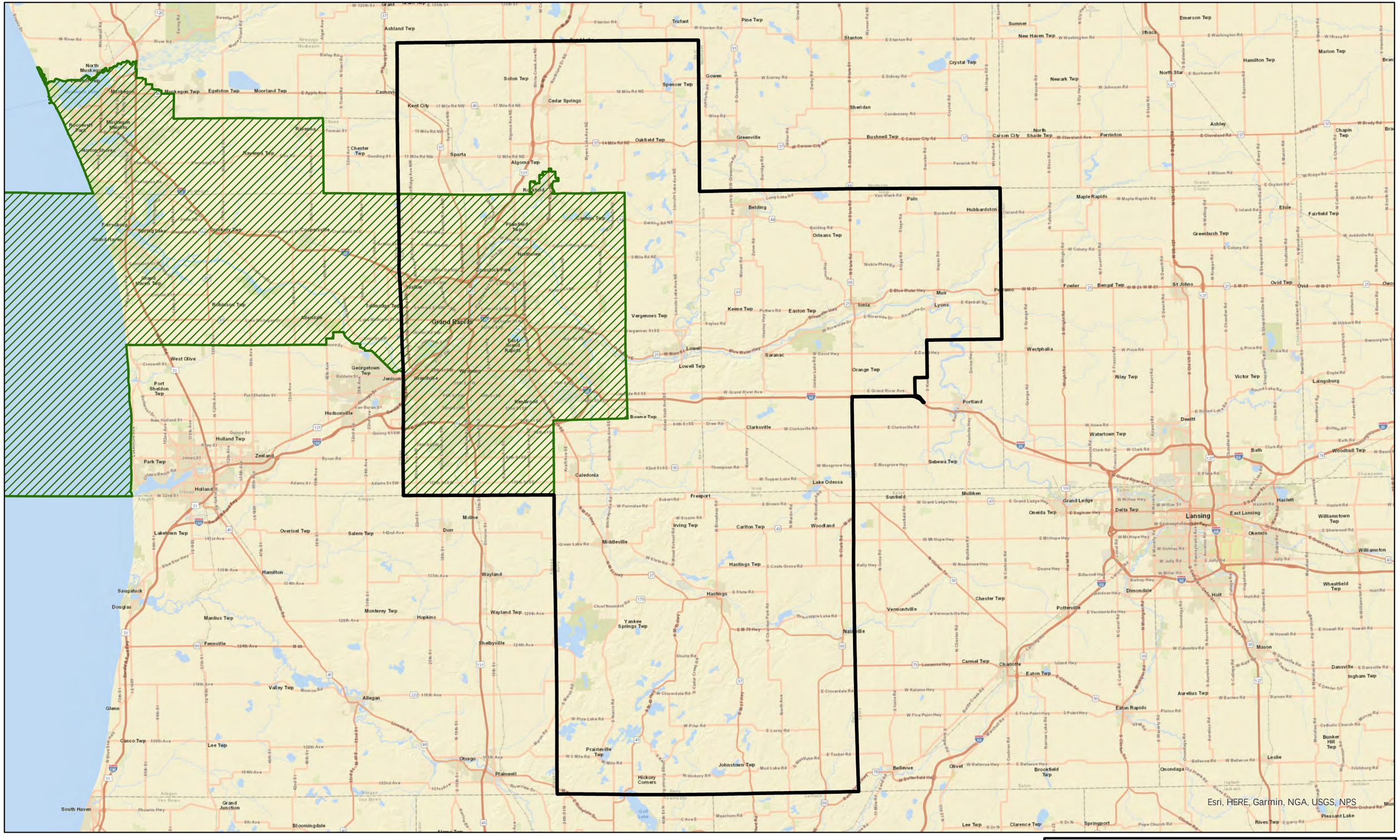
0 10 20 40 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District 3

Election Data Services



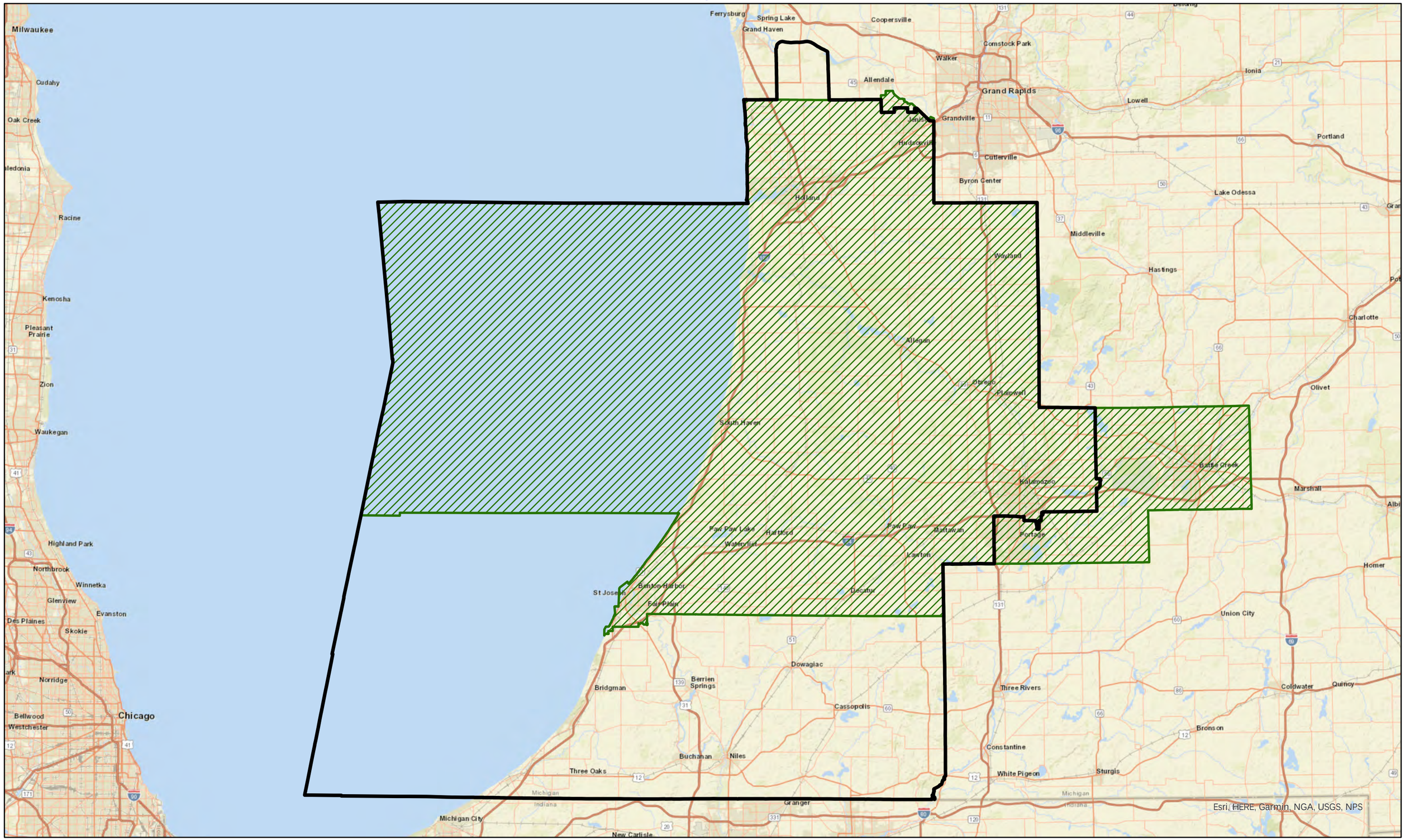
0 5 10 20 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District 4

Election Data Services



0 5 10 20 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District 5

Election Data Services

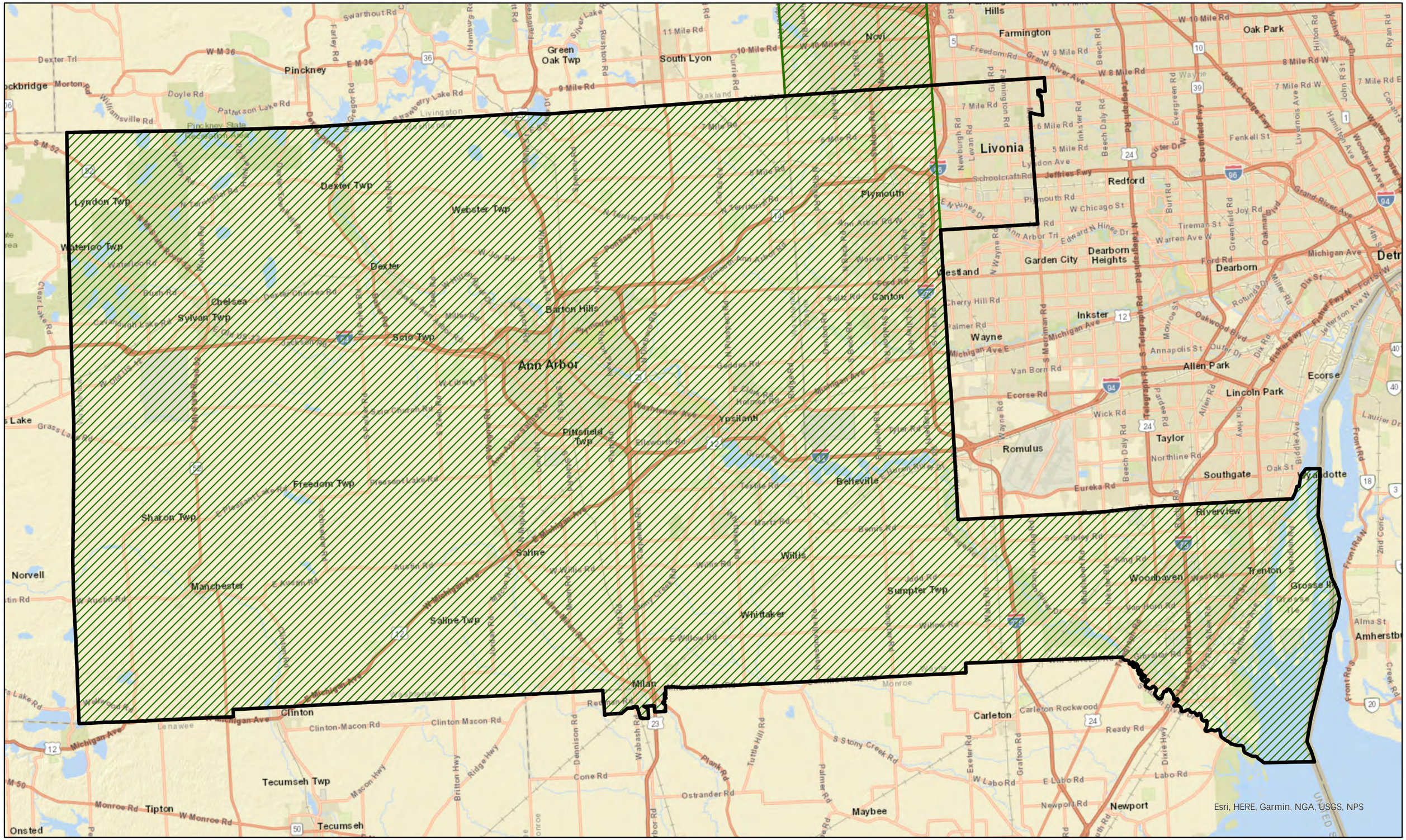
Middleville
Wayland
Hastings
Williamston
Webberville
Fowlerville
Rochester Hills
Pontiac
Sterling Heights
Potterville
Holt
Howell
Milford
Troy
Birmingham
Mason
Charlotte
Brighton
Wixom
Warren
Allegan
Eaton Rapids
Farmington Hills
Southfield
Royal Oak
Otsego
Plainwell
Olivet
Leslie
Pinckney
South Lyon
Novi
Harper W
Whitmore Lake
Livonia
Gross Pointe P
Dearborn Heights
Dearborn
Detroit
Windso
Dexter
Chelsea
Westland
Canton
Battle Creek
Kalamazoo
Marshall
Albion
Jackson
Ann Arbor
Ypsilanti
Taylor
Romulus
Belleville
Paw Paw
Mattawan
Portage
Lawton
Saline
Manchester
Homer
Milan
Carleton
Tecumseh
Dundee
Monroe
Union City
Three Rivers
Coldwater
Quincy
Hillsdale
Adrian
Hudson
Blissfield
Constantine
White Pigeon
Sturgis
Bronson
Temperance
Lambertville
Indiana
Ohio
Middlebury
Lagrange
Angola
Goshen
Montpelier
West Unity
Delta
Swanton
Sylvania
Toledo
Perrysburg
Wauseon
Archbold
Whitehouse
Waterville
Genoa
Oak Harbor
Woodville
Ligonier
Kendallville
Waterloo
Butler
Edgerton
Bryan
Syracuse

Esri, HERE, Garmin, NGA, USGS, NPS

0 5 10 20 Miles

Chestnut District
Congress_fromPlaintiff

Michigan - Plaintiff Congressional District 6



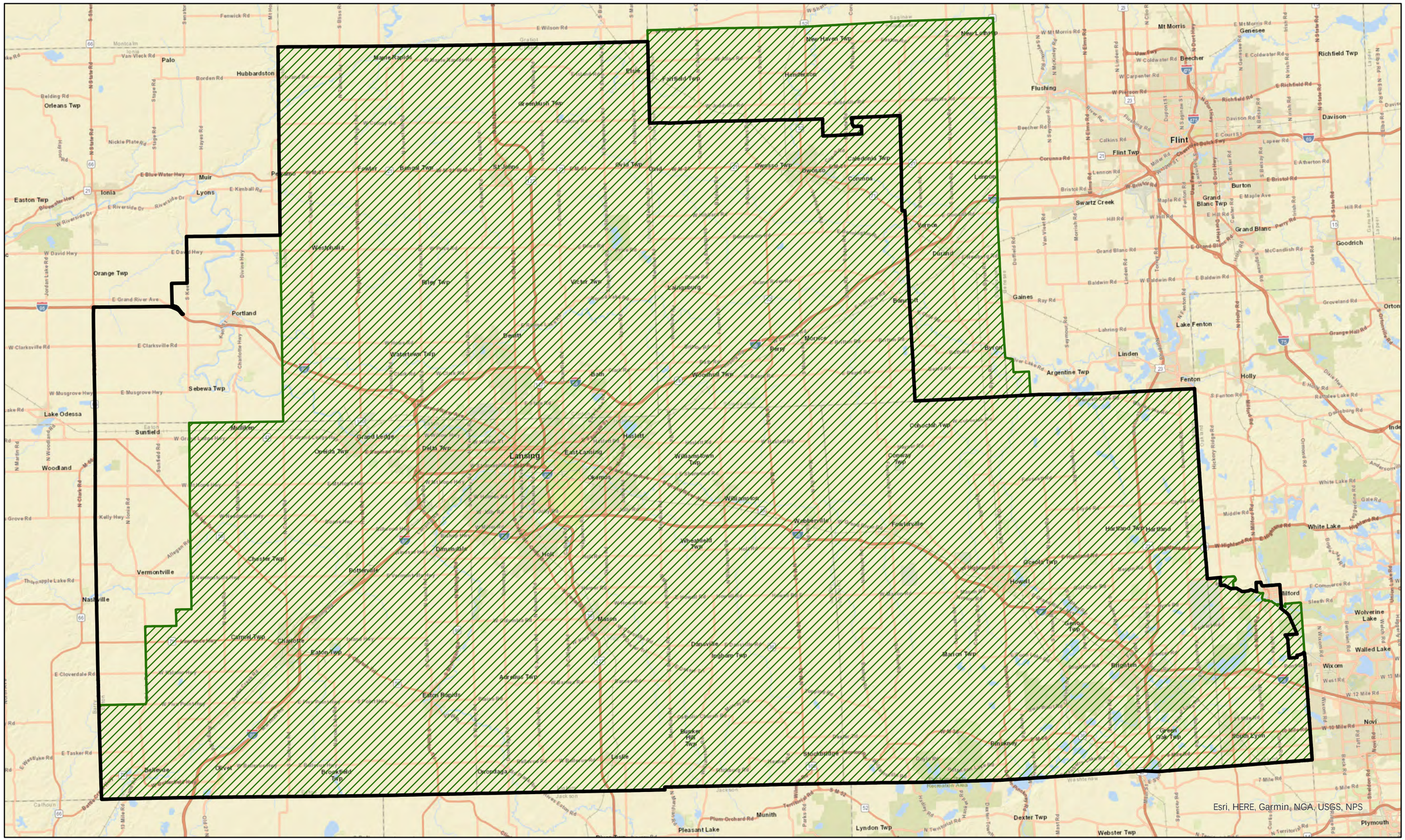
0 2.75 5.5 11 Miles

Chestnut District

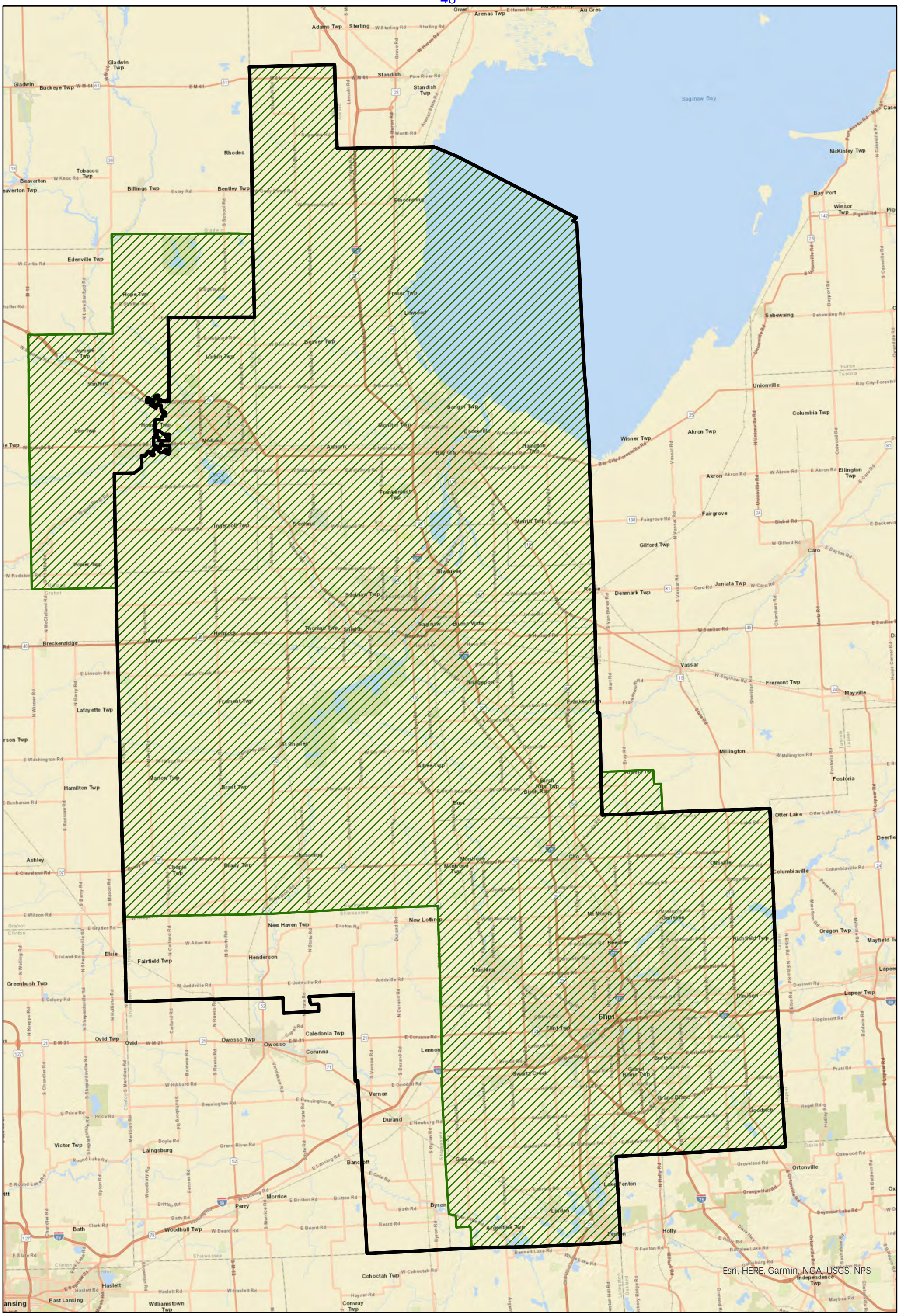
Congress_fromPlaintiff

Michigan - Plaintiff Congressional District 7

Election Data Services



Michigan - Plaintiff Congressional District - 8

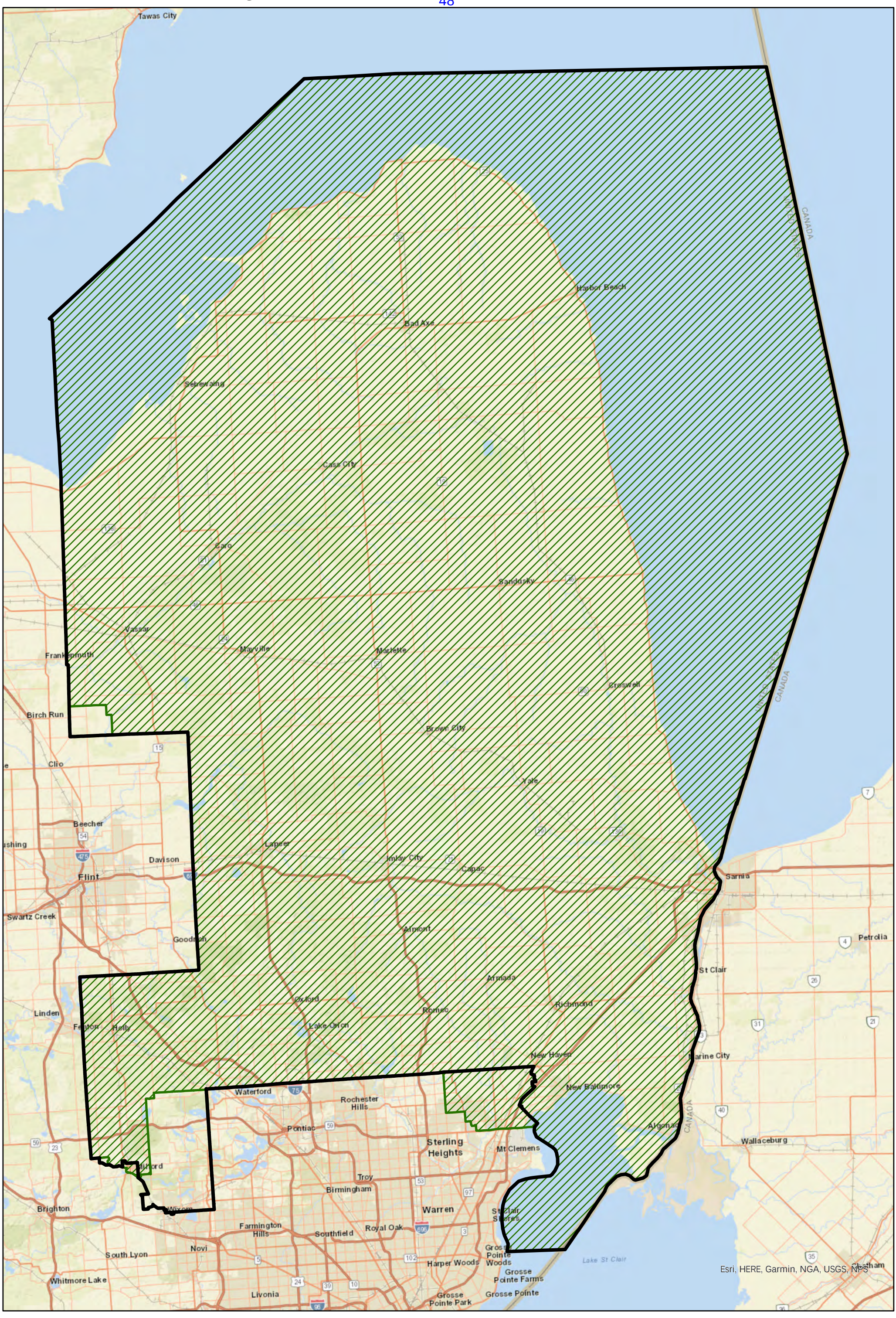


0 4.75 9.5 19 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District - 9

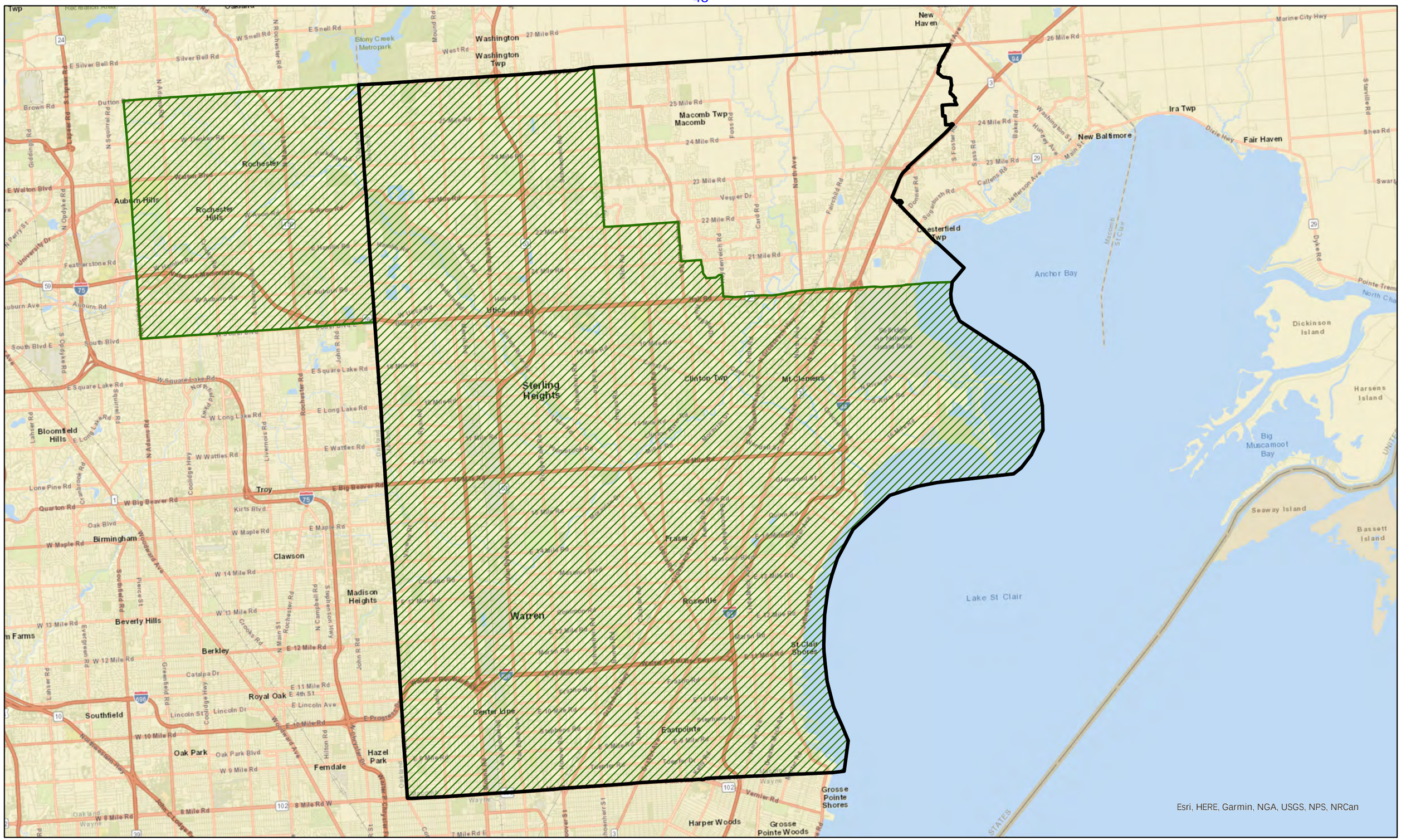


0 5 10 20 Miles

Chestnut District

Congress_fromPlaintiff

Michigan - Plaintiff Congressional District - 10



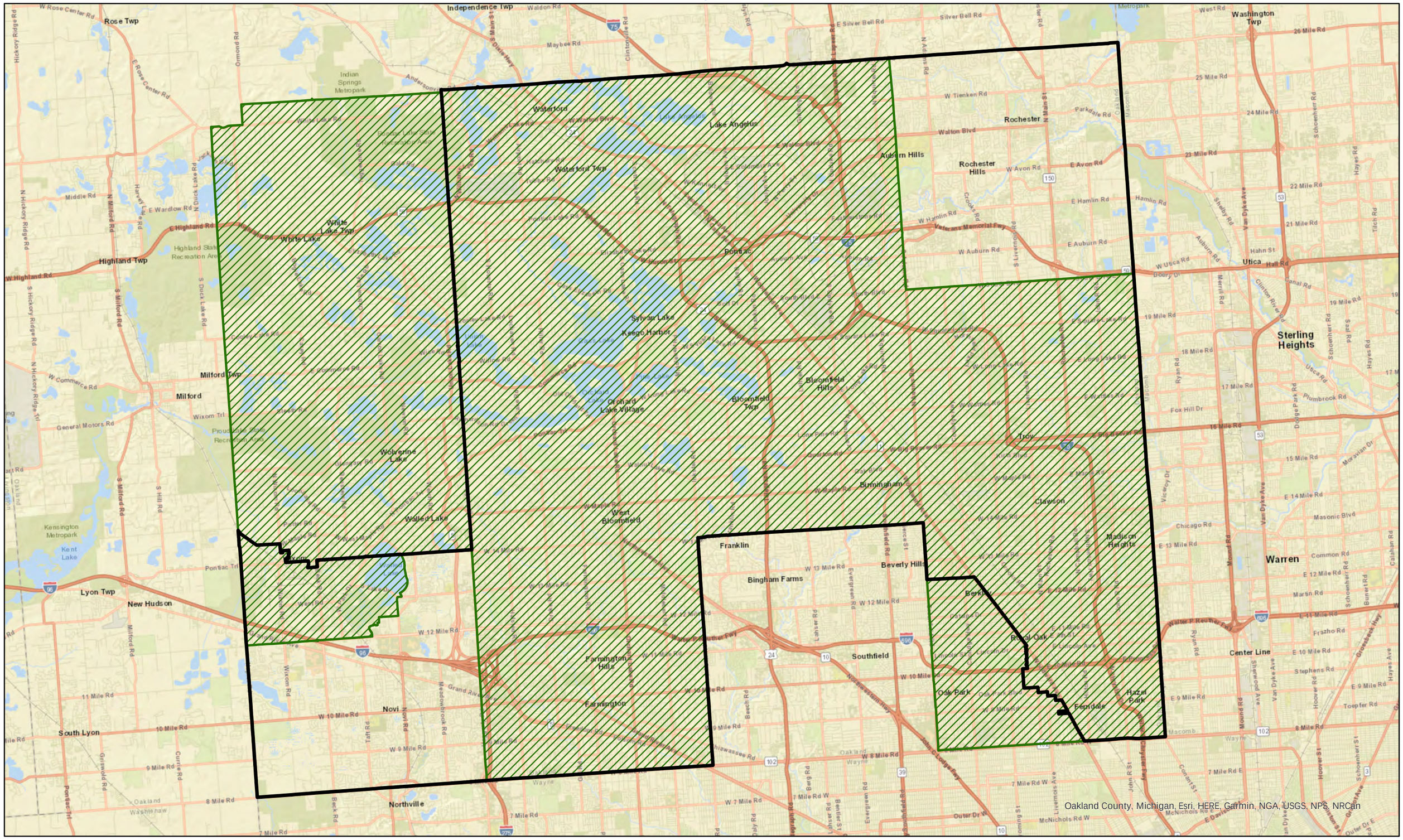
0 1.75 3.5 7 Miles

Chestnut District

Congress_fromPlaintiff

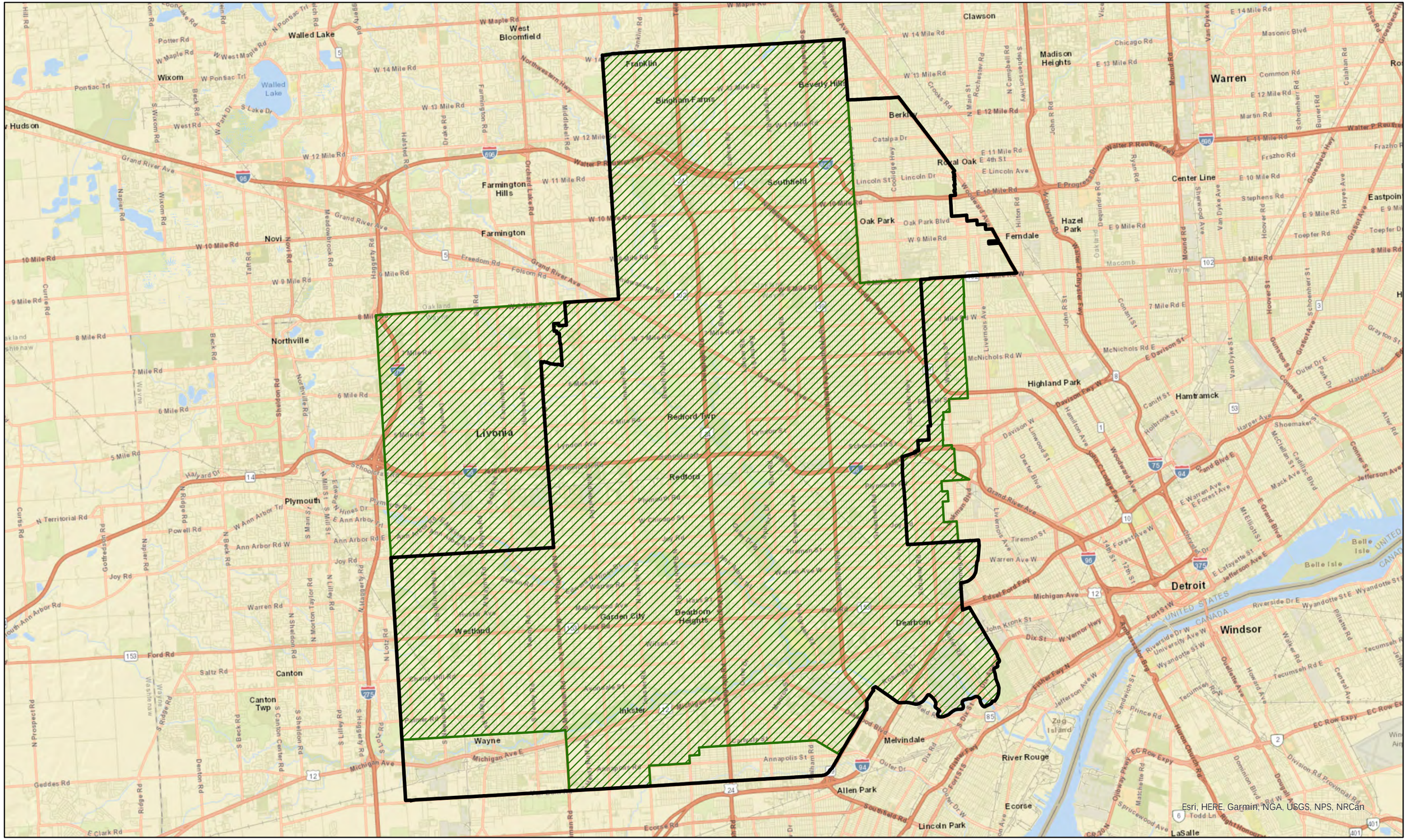
Michigan - Plaintiff Congressional District 11

Election Data Services



Michigan - Plaintiff Congressional District 12

Election Data Services



Michigan - Plaintiff Congressional District 13

Election Data Services

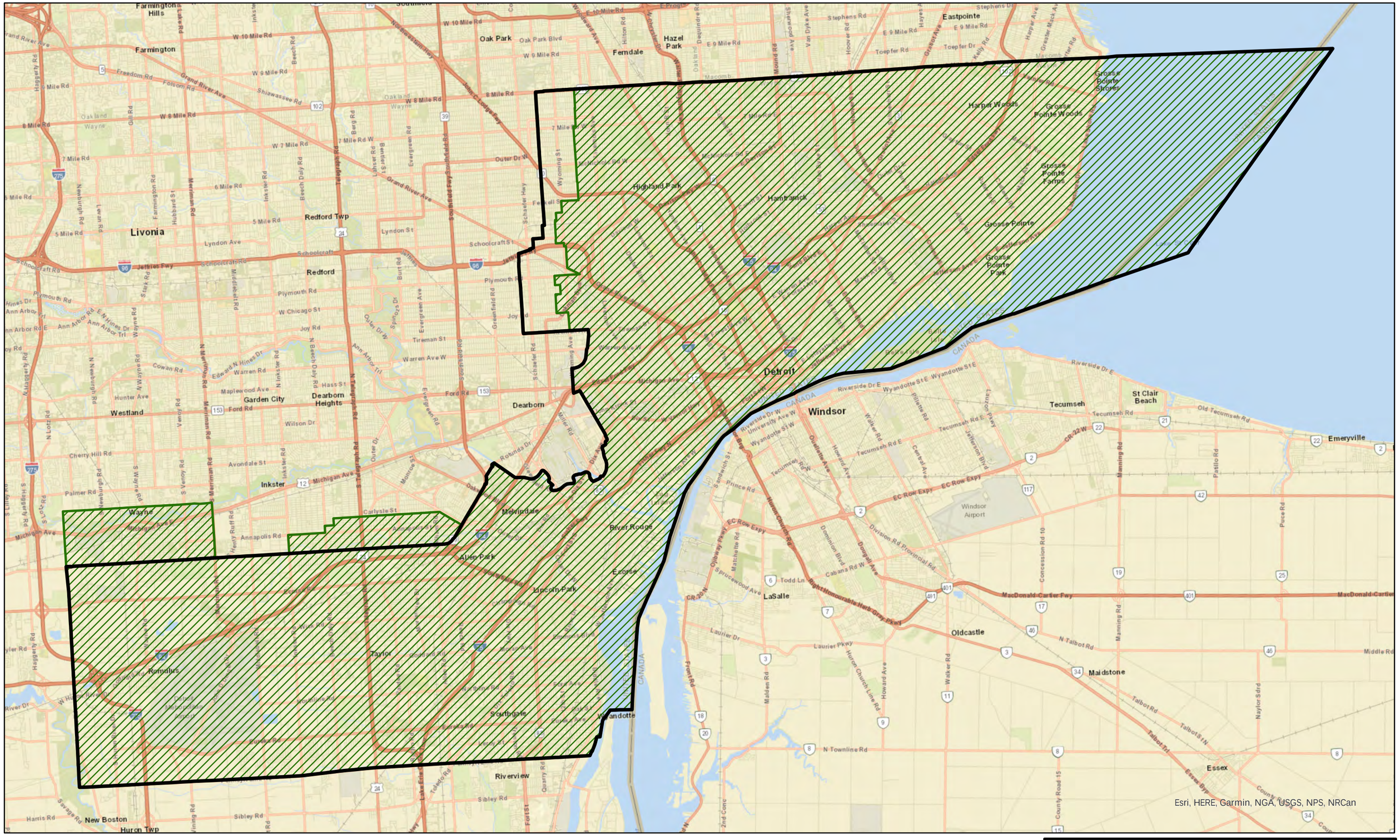


Exhibit E

MI_SplitsReport_CongressionalPlansB.xlsx

Plaintiff's Congressional Plan

P_Counties

DISTRICT	County	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
3	Ionia	54,782	66,804	775,179	7.07%	82.00%
7	Ionia	12,022	66,804	775,179	1.55%	18.00%
4	Kalamazoo	184,730	261,670	775,180	23.83%	70.60%
5	Kalamazoo	76,940	261,670	775,179	9.93%	29.40%
9	Macomb	106,038	881,217	775,179	13.68%	12.03%
10	Macomb	775,179	881,217	775,179	100.00%	87.97%
2	Midland	27,426	83,494	775,180	3.54%	32.85%
8	Midland	56,068	83,494	775,179	7.23%	67.15%
5	Monroe	152,593	154,809	775,179	19.68%	98.57%
6	Monroe	2,216	154,809	775,180	0.29%	1.43%
7	Oakland	46,914	1,274,395	775,179	6.05%	3.68%
9	Oakland	294,798	1,274,395	775,179	38.03%	23.13%
11	Oakland	775,179	1,274,395	775,179	100.00%	60.83%
12	Oakland	157,504	1,274,395	775,179	20.32%	12.36%
2	Ottawa	107,744	296,200	775,180	13.90%	36.38%
4	Ottawa	188,456	296,200	775,180	24.31%	63.62%
7	Shiawassee	49,174	68,094	775,179	6.34%	72.21%
8	Shiawassee	18,920	68,094	775,179	2.44%	27.79%
6	Wayne	400,706	1,793,561	775,180	51.69%	22.34%
12	Wayne	617,675	1,793,561	775,179	79.68%	34.44%
13	Wayne	775,180	1,793,561	775,180	100.00%	43.22%
1	Wexford	3,920	33,673	775,179	0.51%	11.64%
2	Wexford	29,753	33,673	775,180	3.84%	88.36%

Exhibit F

MI_SplitsReport_CongressionalPlansB.xlsx
Plaintiff's Congressional Plan
P_Townships

DISTRICT	County	Township	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
3	Ionia County	Orange, Ionia County	744	1012	775179	0.10%	73.52%
7	Ionia County	Orange, Ionia County	268	1012	775179	0.03%	26.48%
4	Kalamazoo County	Portage, Kalamazoo County	4776	48891	775180	0.62%	9.77%
5	Kalamazoo County	Portage, Kalamazoo County	44115	48891	775179	5.69%	90.23%
4	Kalamazoo County	Ross, Kalamazoo County	19	4851	775180	0.00%	0.39%
5	Kalamazoo County	Ross, Kalamazoo County	4832	4851	775179	0.62%	99.61%
9	Macomb County	Chesterfield, Macomb County	25027	45376	775179	3.23%	55.15%
10	Macomb County	Chesterfield, Macomb County	20349	45376	775179	2.63%	44.85%
2	Midland County	Homer, Midland County	2250	3993	775180	0.29%	56.35%
8	Midland County	Homer, Midland County	1743	3993	775179	0.22%	43.65%
5	Monroe County	Milan, Monroe County	1569	3785	775179	0.20%	41.45%
6	Monroe County	Milan, Monroe County	2216	3785	775180	0.29%	58.55%
11	Oakland County	Ferndale, Oakland County	10781	19190	775179	1.39%	56.18%
12	Oakland County	Ferndale, Oakland County	8409	19190	775179	1.08%	43.82%
7	Oakland County	Milford, Oakland County	11897	17090	775179	1.53%	69.61%
9	Oakland County	Milford, Oakland County	5193	17090	775179	0.67%	30.39%
11	Oakland County	Royal Oak, Oakland County	58211	60585	775179	7.51%	96.08%
12	Oakland County	Royal Oak, Oakland County	2374	60585	775179	0.31%	3.92%
11	Oakland County	Southfield, Oakland County	13	91504	775179	0.00%	0.01%
12	Oakland County	Southfield, Oakland County	91491	91504	775179	11.80%	99.99%
9	Oakland County	Wixom, Oakland County	10384	17193	775179	1.34%	60.40%
11	Oakland County	Wixom, Oakland County	6809	17193	775179	0.88%	39.60%
2	Ottawa County	Georgetown, Ottawa County	7846	54091	775180	1.01%	14.51%
4	Ottawa County	Georgetown, Ottawa County	46245	54091	775180	5.97%	85.49%
7	Shiawassee County	Caledonia, Shiawassee County	4114	4360	775179	0.53%	94.36%
8	Shiawassee County	Caledonia, Shiawassee County	246	4360	775179	0.03%	5.64%
12	Wayne County	Detroit, Wayne County	205233	639111	775179	26.48%	32.11%
13	Wayne County	Detroit, Wayne County	433878	639111	775180	55.97%	67.89%
6	Wayne County	Livonia, Wayne County	62466	95535	775180	8.06%	65.39%
12	Wayne County	Livonia, Wayne County	33069	95535	775179	4.27%	34.61%
1	Wexford County	Wexford, Wexford County	653	1161	775176	0.08%	56.24%
2	Wexford County	Wexford, Wexford County	508	1161	775180	0.07%	43.76%

Exhibit G

MI_SplitsReport_CongressionalPlansB.xlsx
Chestnut Congressional Plan by MICRC
C_Townships

DISTRICT	County	Township	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
4	Berrien County	Lincoln, Berrien County	544	14929	774600	0.07%	3.64%
5	Berrien County	Lincoln, Berrien County	14385	14929	774544	1.86%	96.36%
4	Berrien County	Royalton, Berrien County	186	5141	774600	0.02%	3.62%
5	Berrien County	Royalton, Berrien County	4955	5141	774544	0.64%	96.38%
2	Eaton County	Kalamo, Eaton County	789	1765	774997	0.10%	44.70%
7	Eaton County	Kalamo, Eaton County	976	1765	775238	0.13%	55.30%
7	Genesee County	Argentine, Genesee County	203	7091	775238	0.03%	2.86%
8	Genesee County	Argentine, Genesee County	6888	7091	775229	0.89%	97.14%
9	Macomb County	Macomb, Macomb County	68947	91663	774962	8.90%	75.22%
10	Macomb County	Macomb, Macomb County	22716	91663	775218	2.93%	24.78%
5	Monroe County	Milan, Monroe County	1569	3785	774544	0.20%	41.45%
6	Monroe County	Milan, Monroe County	2216	3785	775273	0.29%	58.55%
2	Muskegon County	Laketon, Muskegon County	7255	7626	774997	0.94%	95.14%
3	Muskegon County	Laketon, Muskegon County	371	7626	775414	0.05%	4.86%
2	Muskegon County	Muskegon, Muskegon County	7723	55914	774997	1.00%	13.81%
3	Muskegon County	Muskegon, Muskegon County	48191	55914	775414	6.21%	86.19%
2	Muskegon County	North Muskegon, Muskegon County	2443	4093	774997	0.32%	59.69%
3	Muskegon County	North Muskegon, Muskegon County	1650	4093	775414	0.21%	40.31%
7	Oakland County	Milford, Oakland County	9641	17090	775238	1.24%	56.41%
9	Oakland County	Milford, Oakland County	7449	17090	774962	0.96%	43.59%
6	Oakland County	Novi, Oakland County	59233	66403	775273	7.64%	89.20%
11	Oakland County	Novi, Oakland County	7170	66403	775568	0.92%	10.80%
9	Oakland County	White Lake, Oakland County	1271	30950	774962	0.16%	4.11%
11	Oakland County	White Lake, Oakland County	29679	30950	775568	3.83%	95.89%
3	Ottawa County	Georgetown, Ottawa County	2679	54091	775414	0.35%	4.95%
4	Ottawa County	Georgetown, Ottawa County	51412	54091	774600	6.64%	95.05%
8	Tuscola County	Arbela, Tuscola County	1398	2808	775229	0.18%	49.79%
9	Tuscola County	Arbela, Tuscola County	1410	2808	774962	0.18%	50.21%
12	Wayne County	Dearborn Heights, Wayne County	43090	63292	775247	5.56%	68.08%
13	Wayne County	Dearborn Heights, Wayne County	20202	63292	775666	2.60%	31.92%
12	Wayne County	Detroit, Wayne County	242662	639111	775247	31.30%	37.97%
13	Wayne County	Detroit, Wayne County	396449	639111	775666	51.11%	62.03%
1	Wexford County	Wexford, Wexford County	849	1161	775372	0.11%	73.13%
2	Wexford County	Wexford, Wexford County	312	1161	774997	0.04%	26.87%

Exhibit H

MI_SplitsReport_CongressionalPlansB.xlsx

Plaintiff's Congressional Plan

P_Places

DISTRICT	Place (City, Village, Census Designated Place)	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
2	Casnovia village	165	316			52.22%
3	Casnovia village	151	316			47.78%
12	Detroit city	205,233	639,111			32.11%
13	Detroit city	433,878	639,111			67.89%
8	Fenton city	12,014	12,050			99.70%
9	Fenton city	36	12,050			0.30%
11	Ferndale city	10,781	19,190			56.18%
12	Ferndale city	8,409	19,190			43.82%
3	Hubbardston village	336	369			91.06%
7	Hubbardston village	33	369			8.94%
6	Livonia city	62,466	95,535			65.39%
12	Livonia city	33,069	95,535			34.61%
6	Northville city	2,793	6,119			45.64%
11	Northville city	3,326	6,119			54.36%
8	Otter Lake village	67	426			15.73%
9	Otter Lake village	359	426			84.27%
4	Portage city	4,776	48,891			9.77%
5	Portage city	44,115	48,891			90.23%
8	Reese village	24	1,261			1.90%
9	Reese village	1,237	1,261			98.10%
10	Village of Grosse Pointe Shores city	77	2,647			2.91%
13	Village of Grosse Pointe Shores city	2,570	2,647			97.09%
6	Whitmore Lake CDP	4,919	7,584			64.86%
7	Whitmore Lake CDP	2,665	7,584			35.14%
9	Wixom city	10,384	17,193			60.40%
11	Wixom city	6,809	17,193			39.60%

District populations within Cities, Villages, and Census Designated Places do not equal 100% of a District

Exhibit I

MI_SplitsReport_CongressionalPlansB.xlsx
Plaintiff's Congressional Plan
P_VTDs

DISTRICT	VTD	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
8	Voting District 0492776000002	2,051	2,087	775,179	0.26%	98.28%
9	Voting District 0492776000002	36	2,087	775,179	0.00%	1.72%
3	Voting District 0676092000001	744	1,012	775,179	0.10%	73.52%
7	Voting District 0676092000001	268	1,012	775,179	0.03%	26.48%
4	Voting District 0776556000002	351	2,323	775,180	0.05%	15.11%
5	Voting District 0776556000002	1,972	2,323	775,179	0.25%	84.89%
4	Voting District 0776556000003	34	2,828	775,180	0.00%	1.20%
5	Voting District 0776556000003	2,794	2,828	775,179	0.36%	98.80%
4	Voting District 0776556000011	1,706	2,891	775,180	0.22%	59.01%
5	Voting District 0776556000011	1,185	2,891	775,179	0.15%	40.99%
4	Voting District 0776556000015	973	2,410	775,180	0.13%	40.37%
5	Voting District 0776556000015	1,437	2,410	775,179	0.19%	59.63%
4	Voting District 0776556000020	1,712	1,993	775,180	0.22%	85.90%
5	Voting District 0776556000020	281	1,993	775,179	0.04%	14.10%
9	Voting District 0991534000001	2,241	2,280	775,179	0.29%	98.29%
10	Voting District 0991534000001	39	2,280	775,179	0.01%	1.71%
9	Voting District 0991534000013	983	2,786	775,179	0.13%	35.28%
10	Voting District 0991534000013	1,803	2,786	775,179	0.23%	64.72%
9	Voting District 0991534000016	308	1,839	775,179	0.04%	16.75%
10	Voting District 0991534000016	1,531	1,839	775,179	0.20%	83.25%
2	Voting District 1113898000001	694	1,138	775,180	0.09%	60.98%
8	Voting District 1113898000001	444	1,138	775,179	0.06%	39.02%
2	Voting District 1113898000003	302	1,601	775,180	0.04%	18.86%
8	Voting District 1113898000003	1,299	1,601	775,179	0.17%	81.14%
2	Voting District 1114616000001	7	2,059	775,180	0.00%	0.34%
8	Voting District 1114616000001	2,052	2,059	775,179	0.26%	99.66%
5	Voting District 1155390000001	1,569	1,586	775,179	0.20%	98.93%
6	Voting District 1155390000001	17	1,586	775,180	0.00%	1.07%
11	Voting District 1252788000001	725	2,680	775,179	0.09%	27.05%
12	Voting District 1252788000001	1,955	2,680	775,179	0.25%	72.95%
11	Voting District 1252788000009	97	2,282	775,179	0.01%	4.25%
12	Voting District 1252788000009	2,185	2,282	775,179	0.28%	95.75%
7	Voting District 1255398000001	476	2,094	775,179	0.06%	22.73%
9	Voting District 1255398000001	1,618	2,094	775,179	0.21%	77.27%
7	Voting District 1255398000002	790	2,470	775,179	0.10%	31.98%
9	Voting District 1255398000002	1,680	2,470	775,179	0.22%	68.02%
7	Voting District 1255398000004	1,373	1,915	775,179	0.18%	71.70%
9	Voting District 1255398000004	542	1,915	775,179	0.07%	28.30%
7	Voting District 1255398000005	518	1,871	775,179	0.07%	27.69%
9	Voting District 1255398000005	1,353	1,871	775,179	0.17%	72.31%
9	Voting District 1258814000002	2,405	2,807	775,179	0.31%	85.68%
11	Voting District 1258814000002	402	2,807	775,179	0.05%	14.32%

MI_SplitsReport_CongressionalPlansB.xlsx
Plaintiff's Congressional Plan
P_VTDs

DISTRICT	VTD	Population of Component	Population of City/Township	Population of District	Percent of District	Percent of City/Township
9	Voting District 1258814000003	710	6,667	775,179	0.09%	10.65%
11	Voting District 1258814000003	5,957	6,667	775,179	0.77%	89.35%
9	Voting District 1258814000004	3,541	3,991	775,179	0.46%	88.72%
11	Voting District 1258814000004	450	3,991	775,179	0.06%	11.28%
2	Voting District 1393188000001	3,492	5,952	775,180	0.45%	58.67%
4	Voting District 1393188000001	2,460	5,952	775,180	0.32%	41.33%
2	Voting District 1393188000004	454	3,012	775,180	0.06%	15.07%
4	Voting District 1393188000004	2,558	3,012	775,180	0.33%	84.93%
2	Voting District 1393188000005	427	3,199	775,180	0.06%	13.35%
4	Voting District 1393188000005	2,772	3,199	775,180	0.36%	86.65%
7	Voting District 1551252000001	2,086	2,332	775,179	0.27%	89.45%
8	Voting District 1551252000001	246	2,332	775,179	0.03%	10.55%
12	Voting District 1632200002225	1,156	1,988	775,179	0.15%	58.15%
13	Voting District 1632200002225	832	1,988	775,180	0.11%	41.85%
12	Voting District 1632200007393	650	1,284	775,179	0.08%	50.62%
13	Voting District 1632200007393	634	1,284	775,180	0.08%	49.38%
6	Voting District 1634900000002A	1,453	2,484	775,180	0.19%	58.49%
12	Voting District 1634900000002A	1,031	2,484	775,179	0.13%	41.51%
6	Voting District 1634900000011A	1,756	2,700	775,180	0.23%	65.04%
12	Voting District 1634900000011A	944	2,700	775,179	0.12%	34.96%
1	Voting District 1658650000001	653	1,161	775,179	0.08%	56.24%
2	Voting District 1658650000001	508	1,161	775,180	0.07%	43.76%

EXHIBIT G

EXHIBIT G

STATE OF MICHIGAN
IN THE SUPREME COURT

LEAGUE OF WOMEN VOTERS OF MICHIGAN, AMERICAN CITIZENS FOR JUSTICE, APIA VOTE-MICHIGAN, DETROIT ACTION, LGBT DETROIT, NORTH FLINT NEIGHBORHOOD ACTION COUNCIL, RISING VOICES, KENT BLOHM, CATHY BROCKINGTON, DENISE HARTSOUGH, DONNA HORNBERGER, GILDA JACOBS, JUDY KARANDJEFF, MARGARET LEARY, ATHENA MCKAY, CHRISTINE PAWLAK, KATHERINE PRIMEAU, RONALD PRIMEAU, SUSAN ROBERTSON, SUE SMITH,

Plaintiffs,

v

INDEPENDENT CITIZENS REDISTRICTING COMMISSION,

Defendant.
_____/

Supreme Court No. 164022

SECRETARY OF STATE JOCELYN BENSON'S AMICUS CURIAE BRIEF REGARDING ELECTION ADMINISTRATION TIMELINE AND MAP IMPLEMENTATION

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Dated: February 9, 2022

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INDEX OF AUTHORITIES

STATEMENT OF JURISDICTION

This is an original action brought by Plaintiff League of Women Voters of Michigan and several other voting rights agencies and individual voters against the Michigan Independent Citizens Redistricting Commission. This Court has jurisdiction over this original action under article 6, § 4 and article 4, § 6(19) of the Michigan Constitution, as amended. Section 4 of article 6 provides that this Court has "the power to issue, hear and determine prerogative and remedial writs[.]" Const 1963, art 6, § 4. Subsection 6(19) of article 4 expressly provides that this Court, "in the exercise of original jurisdiction, shall direct the secretary of state or the commission to perform their respective duties[.]" Const 1963, art 4, § 6(19).

STATEMENT OF QUESTION PRESENTED

1. As a remedy to any unconstitutionality of the state house districting plan, should the Court vacate the plan and remand to the ICRC to promptly correct the plan?

   Plaintiffs' answer: Yes.

   ICRC answers: No.

   Amicus Curiae Benson answers: Any change to the state house plan should be effectuated as quickly as possible.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

Const 1963, art 4, § 6 provides, in relevant part:

> (1) An independent citizens redistricting commission for state legislative and congressional districts (hereinafter, the "commission") is hereby established as a permanent commission in the legislative branch. The commission shall consist of 13 commissioners. The commission shall adopt a redistricting plan for each of the following types of districts: state senate districts, state house of representative districts, and congressional districts. . . .
>
> ***
>
> (4) The secretary of state shall be secretary of the commission without vote, and in that capacity shall furnish, under the direction of the commission, all technical services that the commission deems necessary. The commission shall elect its own chairperson. The commission has the sole power to make its own rules of procedure. The commission shall have procurement and contracting authority and may hire staff and consultants for the purposes of this section, including legal representation.
>
> ***
>
> (7) The secretary of state shall issue a call convening the commission by October 15 in the year of the federal decennial census. Not later than November 1 in the year immediately following the federal decennial census, the commission shall adopt a redistricting plan under this section for each of the following types of districts: state senate districts, state house of representative districts, and congressional districts.
>
> (8) Before commissioners draft any plan, the commission shall hold at least ten public hearings throughout the state for the purpose of informing the public about the redistricting process and the purpose and responsibilities of the commission and soliciting information from the public about potential plans. The commission shall receive for consideration written submissions of proposed redistricting plans and any supporting materials, including underlying data, from any member of the public. These written submissions are public records.
>
> (9) After developing at least one proposed redistricting plan for each type of district, the commission shall publish the proposed redistricting plans and any data and supporting materials used to develop the plans. Each commissioner may only propose one redistricting plan for each type of district. The commission shall hold at least five public hearings throughout the state for the purpose of soliciting comment

from the public about the proposed plans. Each of the proposed plans shall include such census data as is necessary to accurately describe the plan and verify the population of each district, and a map and legal description that include the political subdivisions, such as counties, cities, and townships; man-made features, such as streets, roads, highways, and railroads; and natural features, such as waterways, which form the boundaries of the districts.

(10) Each commissioner shall perform his or her duties in a manner that is impartial and reinforces public confidence in the integrity of the redistricting process. The commission shall conduct all of its business at open meetings. Nine commissioners, including at least one commissioner from each selection pool shall constitute a quorum, and all meetings shall require a quorum. The commission shall provide advance public notice of its meetings and hearings. The commission shall conduct its hearings in a manner that invites wide public participation throughout the state. The commission shall use technology to provide contemporaneous public observation and meaningful public participation in the redistricting process during all meetings and hearings.

***

(13) The commission shall abide by the following criteria in proposing and adopting each plan, in order of priority:

(a) Districts shall be of equal population as mandated by the United States constitution, and shall comply with the voting rights act and other federal laws.

(b) Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part.

(c) Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates.

(d) Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness.

(e) Districts shall not favor or disfavor an incumbent elected official or a candidate.

(f) Districts shall reflect consideration of county, city, and township boundaries.

(g) Districts shall be reasonably compact.

(14) The commission shall follow the following procedure in adopting a plan:

(a) Before voting to adopt a plan, the commission shall ensure that the plan is tested, using appropriate technology, for compliance with the criteria described above.

(b) Before voting to adopt a plan, the commission shall provide public notice of each plan that will be voted on and provide at least 45 days for public comment on the proposed plan or plans. Each plan that will be voted on shall include such census data as is necessary to accurately describe the plan and verify the population of each district, and shall include the map and legal description required in part (9) of this section.

(c) A final decision of the commission to adopt a redistricting plan requires a majority vote of the commission, including at least two commissioners who affiliate with each major party, and at least two commissioners who do not affiliate with either major party. If no plan satisfies this requirement for a type of district, the commission shall use the following procedure to adopt a plan for that type of district:

(i) Each commissioner may submit one proposed plan for each type of district to the full commission for consideration.

(ii) Each commissioner shall rank the plans submitted according to preference. Each plan shall be assigned a point value inverse to its ranking among the number of choices, giving the lowest ranked plan one point and the highest ranked plan a point value equal to the number of plans submitted.

(iii) The commission shall adopt the plan receiving the highest total points, that is also ranked among the top half of plans by at least two commissioners not affiliated with the party of the commissioner submitting the plan, or in the case of a plan submitted by non-affiliated commissioners, is ranked among the top half of plans by at least two commissioners affiliated with a major party. If plans are tied for the highest point total, the secretary of state shall randomly select the final plan from those plans. If no plan meets the requirements of this subparagraph, the secretary of state shall randomly select the final plan from among all submitted plans pursuant to part (14)(c)(i).

(15) Within 30 days after adopting a plan, the commission shall publish the plan and the material reports, reference materials, and data used in drawing it, including any programming information used to produce and test the plan. The published materials shall be such that an independent person is able to replicate the conclusion without any modification of any of the published materials.

(16) For each adopted plan, the commission shall issue a report that explains the basis on which the commission made its decisions in achieving compliance with plan requirements and shall include the map and legal description required in part (9) of this section. A commissioner who votes against a redistricting plan may submit a dissenting report which shall be issued with the commission's report.

(17) An adopted redistricting plan shall become law 60 days after its publication. The secretary of state shall keep a public record of all proceedings of the commission and shall publish and distribute each plan and required documentation.

***

(19) The supreme court, in the exercise of original jurisdiction, shall direct the secretary of state or the commission to perform their respective duties, may review a challenge to any plan adopted by the commission, and shall remand a plan to the commission for further action if the plan fails to comply with the requirements of this constitution, the constitution of the United States or superseding federal law. In no event shall any body, except the independent citizens redistricting commission acting pursuant to this section, promulgate and adopt a redistricting plan or plans for this state.

(20) This section is self-executing. If a final court decision holds any part or parts of this section to be in conflict with the United States constitution or federal law, the section shall be implemented to the maximum extent that the United States constitution and federal law permit. Any provision held invalid is severable from the remaining portions of this section. . . .

MCL 168.133 provides:

In order for the name of a person as a candidate for nomination by a political party for the office of representative in congress to appear under a particular party heading on the official primary ballot in the election precincts of a congressional district, a nominating petition shall have been signed by a number of qualified and registered electors residing in the district as determined under section 544f. . . . Beginning January 1, 2014, if the congressional district comprises more than 1

> county, the nominating petition shall be filed with the secretary of state no later than 4 p.m. of the fifteenth Tuesday before the August primary. . . . Beginning January 1, 2014, if the congressional district is within 1 county, the nominating petition shall be filed with the county clerk of that county no later than 4 p.m. of the fifteenth Tuesday before the August primary. Nominating petitions shall be in the form as prescribed in section 544c.

MCL 168.163 provides:

> (1) To obtain the printing of the name of an individual as a candidate for nomination by a political party for the office of state senator or representative under a particular party heading upon the official primary ballots in the various election precincts of a district, there must be filed nominating petitions signed by a number of qualified and registered electors residing in the district as determined under section 544f. If the district comprises more than 1 county, the nominating petitions must be filed with the secretary of state. If the district comprises 1 county or less, the nominating petitions must be filed with the county clerk of that county. Nominating petitions must be in the form prescribed in section 544c. The secretary of state and the various county clerks shall receive nominating petitions for filing in accordance with this act up to 4 p.m. of the fifteenth Tuesday before the August primary.
>
> (2) In lieu of filing a nominating petition, a nonrefundable filing fee of $100.00 may be paid to the county clerk or, for a candidate in a district comprising more than 1 county, to the secretary of state. Payment of the fee and certification of the name of the candidate paying the fee are governed by the same provisions as in the case of nominating petitions. The fee must be deposited in the general fund of the candidate's county of residence and must be used only for the purchase and maintenance of voting equipment.

INTRODUCTION

With respect to the redistricting process in Michigan, the Secretary of State wears two hats.

The first hat: Under the state Constitution, the Secretary of State acts as a non-voting secretary to the Independent Citizens Redistricting Commission, tasked with supporting the work of the Commission. Const 1963, art 4, § 6(4). Secretary of State Jocelyn Benson fulfilled her duties under the Constitution with respect to the new plans adopted by the Commission, and in doing so played no role in drawing or approving the new maps, including the plan challenged here.

The second hat: The Secretary of State is also the "chief election officer" with "supervisory control over local election officials in the performance of their duties under the provisions of this act." MCL 168.21. The Legislature has delegated the task of conducting proper elections to the Secretary, an elected executive-branch officer, and the head of the Department of State. Const 1963, art 2, § 4, art 5, §§ 3, 9. It is in this capacity that Secretary Benson appears before this Court as amicus curiae.

After the adoption of new redistricting plans, the Secretary, through her Bureau of Elections, must update Michigan's electronic list of approximately eight million registered voters to ensure that voters are placed within the correct voting districts. This is a labor-intensive process that involves considerable back and forth with the 1,520 local clerks around the state and thus typically takes months to implement—historically, no less than six months. The intent of the Bureau is to

have the updates finalized for congressional and state house and senate districts by the April 19, 2022 filing deadline for these offices.

Plaintiffs ask this Court to declare the new state house plan unconstitutional and to remand to the Commission for the possible redrawing and adoption of a new plan. But time is of the essence here. The plans were adopted by the Commission on December 28, 2021, and for the last six weeks the Bureau of Elections has worked diligently to implement the new districts into the voter roll. Nevertheless, the Bureau has weeks of work left to do. If this Court is persuaded to grant Plaintiffs' relief, this Court should order the Commission to adopt a new plan on an expedited basis. The Court may also wish to consider ordering additional relief related to the statutory deadlines for candidates seeking these offices.

STATEMENT OF FACTS

Secretary Benson adopts and incorporates the facts as set forth in the Defendant Commission's brief in opposition to the complaint. The Secretary, as amicus curiae, states only those facts necessary to support her position in this brief.

As this Court is generally aware from the lawsuit brought by Secretary Benson and the Commission in June of 2021, see *In re Independent Citizens Redistricting Commission*, Case No. 162891, the U.S. Census Bureau's delay in releasing final redistricting data delayed the work of the Commission, causing it to miss constitutionally imposed deadlines. The delay of the Commission's redistricting work in turn delayed the critical work of the Secretary's Bureau of Elections, which begins after redistricting plans are adopted. Const 1963, art 4, § 6(17).

A. The Secretary of State's duty to implement the new maps.

The Bureau of Elections maintains Michigan's qualified voter file (QVF), which is an electronic list of all registered voters in the state—currently over eight million people. MCL 168.509o. For each voter, the QVF contains the list of all districts in which a voter lives, i.e., federal and state house and senate districts, as well as county, city, and school board districts, etc., which is used, among other things, to determine what ballot[1] a voter receives. MCL 168.509q. The QVF also includes a "street index" of addresses for all registered voters in the state. MCL 168.509p(d). After new maps are adopted by the Commission, the Bureau must update the QVF.

The update generally takes place in three phases. In phase one, the new district lines will be added to the QVF. In phase two, the "street index" will be reviewed to identify where districts have changed, and an update to registrations will be made where voters' districts have changed. To accomplish these updates, the Bureau will do what it can to electronically move large groups of voters at one time. Even so, manual, address-by-address changes will still be required for thousands and thousands of voters where district boundaries limit the use of large or global moves. In the third and final phase, the Bureau of Elections in collaboration with the over 1,500 local clerks will manually review and modify voting precincts, as necessary. See MCL 168.654a, 168.661. This is an extensive

[1] In a statewide election year, there are upwards of 50,000 unique ballot styles in use around the state after accounting for the many and varied layers of offices up for election.

and time-intensive process with several discussions between the local clerks and the Bureau.

With respect to the last redistricting cycle in 2010-2011, the update to the QVF took approximately six months. The Commission's constitutional deadline of November 1 to adopt plans would ordinarily accommodate the Bureau of Elections' multi-month process of updating the QVF. The updates to the QVF should be completed in time to accommodate candidates seeking to run in the August 2, 2022 primary election.

The deadline to collect signatures and file nominating petitions for accessing the primary ballot is April 19, 2022 (the 15th Tuesday before the primary).[2] This includes nominating petitions for congressional representatives, MCL 168.133, and state senators and representatives, MCL 168.163. The completion of this process is essential to the nomination process so the potential candidates can know not only *whom* they would represent, but whether or not they *can*, as Michigan Election Law requires candidates to live in the state senate and house district they wish to represent. MCL 168.162. But more significantly, the Bureau of Elections and the local clerks need to have the QVF updated in order to canvass nominating petitions and determine whether petition-signers are registered to vote in the candidate's district. As a result, the QVF updates for these offices must be completed by the April 19 filing deadline.

[2] See Michigan Election Dates 2022, p 3, available at 2022 Election Dates Booklet (michigan.gov).

B. Status of the Bureau of Elections' update of the qualified voter file.

The Commission adopted new congressional and state house and senate plans on December 28, 2021. Shortly thereafter, the Bureau began working to update the QVF.

The Bureau is presently working on phase one of the update (and has been working on phase one since the districts were drawn more than a month ago). In this phase, the Bureau is automatically updating county commissioner, state house, state senate, and congressional district assignments for jurisdictions that are within a single district. For example, Munising Township in Alger County is entirely contained within a single state house, state senate, and congressional district. This phase should be completed in the next two weeks. (Ex 1, Bureau Bulletins.)

In the second phase, the Bureau will geocode QVF addresses and pre-assign updated district values to street segments based on their location. (*Id.*)[3] This means that new county commissioner, state house, state senate, and congressional district values will be applied (as necessary) to all street segments in jurisdictions split by a district. (*Id.*) For example, Munising Township is split by county commissioner districts 1 and 2. All QVF street segments in Munising Township will automatically be assigned their new county commissioner district during phase two. (*Id.*) Geocoding, a new process for the Bureau, will speed up the

[3] Geocoding is a technique that assigns location values (latitude and longitude coordinates) to addresses. This allows QVF addresses to be placed on a map, and seen relative to the new county commissioner, state house, state senate, and congressional districts. (Ex 1.)

updates, but because it does not always result in the address being placed in the correct district location, the third phase of the update is significant. (*Id.*)

In phase three, local clerks will (1) review the pre-assigned district values and (2) communicate precinct boundary changes to the Bureau. (*Id.*) This manual review step is critical again because geocoding will not always automatically assign addresses the correct district values. (*Id.*) For example, Munising Township will visually compare the new automatically assigned county commissioner district values in the QVF to the new county commissioner district maps approved by the Alger County Reapportionment Committee. If the township is satisfied that the county commissioner district assignments in QVF match the map, and if the township is not altering the precinct boundaries for the districts, no further action is needed. (*Id.*)

Assuming all three phases go according to plan, the Bureau presently estimates that the updates to the QVF will be completed by April 19, 2022 for congressional and state house and senate districts.

ARGUMENT

I. Secretary Benson has no position whether the state house plan adopted by the Commission meets the constitutional criteria. If this Court remands for the drawing of a new plan, it should consider ordering the process be expedited and further consider ordering additional relief relating to candidate filing deadlines.

Secretary Benson was not involved in drawing or approving the adopted maps and has no position on their constitutionality. Indeed, defense of the maps is best left to the body that drew them—the Commission. The Secretary's purpose in filing this amicus curiae brief is to advise the Court of impending deadlines

impacting the August 2, 2022, primary election. While this date may seem distant, in the election context it is right around the corner.

Below is a list of important deadlines:

Date and Time	Action	Statute
March 23	State house or senate candidate must have resided within city or township in district at least 30 days before filing deadline.	MCL 168.10, 168.161
April 19	Candidates for partisan office must file nominating petitions (or fee if applicable) and affidavit of identity for the August primary	MCL 168.93, 168.133, 168.163
April 22	Deadline for candidates to withdraw from the August primary	MCL 168.133, 168.163
April 26	Deadline to submit challenges against nominating petitions filed by partisan candidates to filing official	MCL 168.552
May 31	Board of State Canvassers must complete canvass of nominating petitions filed by candidates for the August Primary; Secretary of State certifies candidates eligible to appear on August primary ballot to county election commissions by June 3.	MCL 168.552
June 3	Approximate date county clerks can begin process of printing ballots for the August primary	
June 18	Delivery of military and overseas absent voter ballots must begin	MCL 168.759a
June 18	Deadline for county clerks to deliver absent voter ballots for the August primary to local clerks	MCL 168.714
June 23	Deadline for absent voter ballots to be made available to voters	Const 1963, art 2 § 4
August 2	State Primary	

As noted above, under the current schedule and based on the adopted, existing plans, the Bureau ***anticipates*** having the QVF updated for the new congressional, state house, and state senate districts by April 19. This would

ensure that the new districts may be utilized for filing and canvassing nominating petitions, although accomplishing this task in the census-delay shortened timeline is difficult.

The Secretary of State is the filing official for congressional candidates and state house and state senate candidates whose districts cross county lines. MCL 168.133, 168.163.[4] Candidates whose districts lie solely within one county file nominating petitions (or fees as applicable) with the county clerk. (*Id.*)[5] So, the Secretary of State and the county clerks will receive numerous nominating petitions come April of 2022. These filing officials will then have to canvass the nominating petitions to determine whether they are supported by the requisite number of valid signatures from registered voters within the districts, see MCL 168.544f, and process any challenges to nominating petitions that are submitted by the deadline. The candidates must then be certified to appear on the ballot, which must occur by May 31, 2022. After that date, counties will begin preparation for printing ballots. By June 18, 2022, absent voter ballots must be available for delivery to military and overseas voters.

In addition to candidate filings, the Secretary of State and local clerks may also be processing petitions to place proposals on the ballot. For example, the Secretary is the filing official for petitions to initiate legislation. See Const 1963, art 2, § 9. These petitions may be filed with the Secretary of State until June 1,

[4] See Filing for Office, Bureau of Elections, January 2022, p 2, available at Filing_for_Office_Partisan_Offices_2022_719292_7.pdf (michigan.gov),
[5] *Id.*

2022. MCL 168.471. Accordingly, the Secretary's Bureau of Elections may, and usually is, canvassing initiative petitions and nominating petitions at the same time. This involves reviewing hundreds of thousands of signatures.

The April 19 deadline for nominating petitions is just one of many deadlines that carefully control the election processes leading up to the August 2, 2022, primary election. These deadlines help ensure that the filing official responsible for canvassing such petitions has time to perform the canvass, that the slate of candidates can be properly certified and that ballots can be printed, proofed, and ready for delivery by the local clerks to absent ballot voters, including military and overseas voters.

A remand to the Commission for redrawing and adopting a state house plan would, or could potentially, re-start the QVF update all over again, depending on how different the maps turn out to be. And the Bureau would not be able to continue the process until the Commission adopted revised maps. Candidates, of course, have been using the previously proposed and adopted maps to determine whether to run and in which district. And while residency in the district is not an issue for congressional candidates, and circulating petitions is not an issue for state house or state senate candidates, by April 19, 2022 all candidates must file affidavits of identity that disclose the office and numerical district sought. See MCL 168.551.[6] If a candidate's affidavit of identity includes the wrong numerical

[6] Candidates for state house and senate seats do not need to file nominating petitions. Instead, they can pay a $100 filing fee and file an affidavit of identity to access the primary ballot. MCL 168.163, MCL 168.558. However, these candidates must live in the districts in which they seek to run for 30 days prior to the filing

district, the candidate's filing will be disqualified.[7] But if the Court remands for redrawing and the adoption of a new plan, it is unclear to the Secretary that the QVF will be updated by April 19, 2022 for these races; completing this task under an even more significantly shortened timeline may not be possible.

Given these concerns, if this Court is inclined to remand for the adoption of a new plan, the Secretary suggests the Court order the Commission to complete the plan under an expedited timeline.

There is, of course, the possibility of an additional remedy. Because the filing deadline is set by statute, the Legislature could relieve the Bureau and candidates by briefly extending the deadline through legislation. Indeed, such legislation was previously introduced, extending the filing deadline until May 10, 2022 (the 12th Tuesday before the primary election). See House Bills 4642 and 4643.[8] The legislation has not moved. Regardless, this Court has previously extended the deadline to file nominating petitions and filing fees in the context of directing the adoption of a redistricting plan. See *In re Apportionment of State Legislature – 1972*, 387 Mich 442, 458 (1972). Thus, the Court on its own initiative could provide additional relief.

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deadline. Congressional candidates do not have a filing fee option and must file nominating petitions, but congressional candidates do not need to live in their districts at the time nominating petitions are filed. MCL 168.131. 168.133.

[7] See Filing for Office, Bureau of Elections, p 3, available at Filing_for_Office_Partisan_Offices_2022_719292_7.pdf (michigan.gov) (accessed February 9, 2022.)

[8] The bills are available at Michigan Legislature - House Bill 4642 (2021) (HB 4642) and Michigan Legislature - House Bill 4643 (2021) (HB 4643) (accessed February 7, 2022).

CONCLUSION AND RELIEF REQUESTED

For the reasons set forth above, Amicus Curiae Secretary of State Jocelyn Benson respectfully requests that if this Court grants relief and remands to the Commission for the redrawing and adoption of a state house plan, the Court order maps be redrawn and adopted on a significantly expedited schedule while adjusting other statutory and constitutional deadlines that are impacted.

Respectfully submitted,

s/Heather S. Meingast
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Dated: February 9, 2022

STATE OF MICHIGAN
IN THE SUPREME COURT

LEAGUE OF WOMEN VOTERS OF MICHIGAN, AMERICAN CITIZENS FOR JUSTICE, APIA VOTE-MICHIGAN, DETROIT ACTION, LGBT DETROIT, NORTH FLINT NEIGHBORHOOD ACTION COUNCIL, RISING VOICES, KENT BLOHM, CATHY BROCKINGTON, DENISE HARTSOUGH, DONNA HORNBERGER, GILDA JACOBS, JUDY KARANDJEFF, MARGARET LEARY, ATHENA MCKAY, CHRISTINE PAWLAK, KATHERINE PRIMEAU, RONALD PRIMEAU, SUSAN ROBERTSON, SUE SMITH,

Plaintiffs,

v

INDEPENDENT CITIZENS REDISTRICTING COMMISSION,

Defendant.
_____/

Supreme Court No. 164022

SECRETARY OF STATE JOCELYN BENSON'S AMICUS CURIAE BRIEF REGARDING ELECTION ADMINISTRATION TIMELINE AND MAP IMPLEMENTATION

EXHIBIT 1

1. Secretary of State News Updates

Michigan Secretary of State's Office

1/27/2022 News Update - Redistricting Edition #2

Michigan Secretary of State sent this bulletin at 01/27/2022 04:54 PM EST

Having trouble viewing this email? View it as a Web page.

Michigan Bureau of Elections
News Update
for Election Administrators

January 27, 2022

Special Redistricting Edition

In this issue:

Overview

The Bureau of Elections is currently working to update the QVF with new district assignments based on post-2020 census redistricting. Compared to prior redistricting cycles, BOE has modernized the redistricting approach in order to make QVF updates as efficient as possible for BOE and clerks. Updates to QVF are proceeding in 3 phases. During the first phase, BOE is automatically updating County Commissioner, State House, State Senate and US Congressional district assignments for jurisdictions that are within a single district. This phase should be completed within the next two weeks. In the second phase, BOE will geocode QVF addresses and pre-assign updated district values to street segments based on their location. In Phase 3, local clerks will both review the pre-assigned district values and communicate precinct boundary changes to BOE. Geocoding addresses to pre-assign them significantly speeds up the process but because it does not always result in the address being in the correct district location, the third phase is critical to ensure addresses are in the right districts.

Clerks may submit precinct boundary changes either by submitting a "marked up" street index listing report (the system used after the 2010 redistricting), or can use the newly developed electronic redistricting module in QVF. Instructions on how to use this new module will be available soon. If anyone would prefer to start the process of determining new precinct boundaries before their redistricting is complete in QVF, a custom voter list can be exported from QVF to help with this process. See the related article, *Custom Voter List for Precinct Totals*.

The Bureau will continue to communicate updates via these weekly special redistricting News Updates to keep you apprised of the progress. Stay tuned for next week's newsletter for details about new voter information (ID) cards.

What is Geocoding?

Geocoding is a technique that assigns location values (latitude and longitude coordinates) to addresses. This allows QVF addresses to be placed on a map, and seen relative to the new County Commissioner, State House, State Senate, and US Congressional Districts.

Approved Maps from Independent Citizens Redistricting Commission

Approved, interactive maps can be viewed at this webpage.

Shape Files: For those using local GIS assistance to draw new precinct boundaries, the shape files for the approved maps (Chestnut, Linden & Hickory) can be downloaded from this webpage.

The new maps will soon be viewable in the state of Michigan District Locator webpage, which includes municipal and precinct boundary layers as well as the district layers. Currently, the tool still has the post-2010 redistricting layers. BOE will inform clerks when this website is available with the updated maps.

Helpful Links

Custom Voter List for Precinct Totals

QVF

A Custom Voter List can be used to estimate voter population totals for new precincts. To generate the report from QVF, follow the steps below. Once the report is generated, you may apply filters, then sort columns based on street name and/or house number. Using the report in this way requires you to visually check the location of streets within your new precincts on a separate map, then tally up the voter records on the custom voter list for that area. Although it can be time-consuming, this method does give you an idea of voter population for new precincts. Inactive/IVF voters may be excluded from the calculation of precinct size. They are still considered eligible voters, but are not counted toward the maximum allowable precinct population. For the purpose of planning resources for running a precinct, you can choose to leave them off this report. Refer to the optional criteria shown below.

Reports>Custom Voter List, Report Options:

Output Format: Listing

Report Format: CSV

Grouping: Ward Precinct

Sort: Address/Last/First/Middle

*Optional Report Criteria

- Select specific precincts for export using the Geography & Precincts tabs
- Exclude the voters on the inactive file by checking the “Exclude Voters in IVF” box

Questions? Please contact the Bureau of Elections at 1-800-292-5973 or elections@michigan.gov.

The Bureau of Elections News Update will always be sent to the Clerk and Deputy Clerk email accounts. If other election administrators would like to receive this newsletter as well use the Subscribe link below to have it sent directly to another email account.

It is recommended that you add misos@govsubscriptions.michigan.gov and MISOS@public.govdelivery.com to your safe senders list.

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2/3/2022 News Update - Redistricting Edition #3 - Voter ID Cards, Three-Phase Redistricting Approach and Recall Elections in May/Ballot Admin

Michigan Secretary of State sent this bulletin at 02/03/2022 04:01 PM EST

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Michigan Bureau of Elections
News Update
for Election Administrators

February 3, 2022

Special Redistricting Edition #3

In this issue:

Voter Information Card (Voter ID Card) Tool for Voters Impacted by Redistricting

The Bureau is developing a special feature in QVF to help you manage your Voter Information Cards (Voter ID cards) for voters impacted by redistricting and reapportionment. The feature will assist you in keeping these cards separate from cards you print on a regular basis from the Inbox. You may choose to print the cards yourself in-house, or export the data to send to a vendor for printing. We anticipate this report/export will be available in QVF by late March. Prior to printing new Voter Information Cards, clerks must review their QVF Street Index changes for accuracy, and any necessary polling location changes should be completed before printing/exporting Voter Information Cards. Once BOE has the functionality and administrative steps in place, we will communicate how changes can be reviewed, and how Voter Information Cards can be generated from QVF.

Recall Elections in May & QVF Ballot Admin

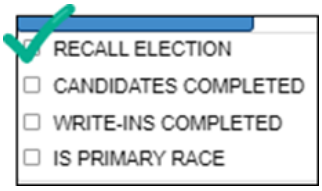
Recall elections on the May 3rd, 2022 ballot must be conducted using the boundaries prior to the 2022 redistricting & reapportionment. The Bureau will refrain from applying district and precinct boundary changes to those communities with a recall until after the May election. It is important to note that counties must check the recall box while completing Ballot Admin, to indicate when an office on the ballot is a recall, no later than

Three-Phase Redistricting Approach in Detail

The Bureau of Elections is currently working to update the QVF with new district assignments based on post-2020 census redistricting. Updates to QVF will happen in 3 phases. During the first phase, BOE is automatically updating County Commissioner, State House, State Senate and US Congressional district assignments for jurisdictions that are within a single district. For example, Munising Township is entirely contained within a single State House, State Senate, and US Congressional district – 109, 38, and 1, respectively. These districts will automatically be assigned during Phase 1. This phase should be completed within the next two weeks.

In the second phase, BOE will geocode QVF addresses, and pre-assign updated district values to street segments based on their location. This means that new county commissioner, State House, State Senate and US Congressional district values will be applied (as necessary) to all street segments in jurisdictions split by a district. For example, Munising Township is split by county commissioner districts 1 and 2. All QVF street segments in Munising Township will automatically be assigned

March 7th, the deadline for the May Election Ballot Admin. Please notify the Bureau ASAP if you anticipate a recall election in May by emailing ElectionData@Michigan.gov.



their new county commissioner district during Phase 2.

In Phase 3, local clerks will (1) review the pre-assigned district values and then (2) communicate precinct boundary changes to BOE. This manual review step is critical, because geocoding address will not always automatically assign addresses the correct district values. For example, Munising Township will visually compare the new automatically assigned county commissioner district values in QVF to the new county commissioner district maps approved by the Alger County reapportionment committee. If the township is satisfied the county commissioner district assignments in QVF match the map, and if the township is not altering their precinct boundaries, no further action is needed.

Helpful Links

Questions? Please contact the Bureau of Elections at 1-800-292-5973 or elections@michigan.gov.

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